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ABSTRACT

In addition to publishing the papers given at key meetings, this series on health facilities includes discussions and responses. The series is intended to help meet the information needs of health service providers and others who require direct access to concepts and ideas evolving from the exchange of research results. Health facility reuse is an activity which will become an increasingly common strategy in addressing the interrelated problems of rising health care costs and surplus of acute care hospital facilities. The Health Facility Reuse Conference investigated "reuse" from six critical issue perspectives: financial feasibility, codes and standards, systems approaches, project implementation, planning strategies, and design evaluation. Policy issues and future research and agenda are presented for each critical issue, and priority activity areas are recommended. Any health organization must be considered an infrastructural institution within its community, and any flexibility which can be generated in the existing health facility system must be directed to satisfy broad economic and social criteria. This project has tried to establish the direction for systematic research into the often adhoc or reactive capital investment in existing health facility resources. (Author/JN)

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The *Research Proceedings Series* is published by the National Center for Health Services Research (NCHSR) to extend the availability of new research announced at conferences, symposia and seminars sponsored or supported by NCHSR. In addition to publishing the papers given at key meetings, this series includes discussions and responses whenever possible. The series is intended to help meet the information needs of health services providers and others who require direct access to concepts and ideas evolving from the exchange of research results.

Abstract

Health facility reuse is an activity which will become an increasingly common strategy to address the linked problems of rising health care costs and a surplus of acute care hospital facilities. The Health Facility Reuse Conference conducted in April, 1978, at the Graduate School of Architecture and Planning, Columbia University, investigated "reuse" from six critical issue perspectives: financial feasibility, codes and standards, systems approaches, project implementation, planning strategies, and design evaluation. Policy issues and future research agenda are presented for each critical issue, and priority activity areas are recommended. Any health organization must be considered an infrastructural institution within its community, and any flexibility which can be generated in the existing health facility system must be directed to satisfy broad economic and social criteria. This project has tried to establish the direction for systematic research into the often adhoc or reactive capital investment in existing health facility resources.

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RESEARCH PROCEEDINGS SERIES

Health Facility Reuse, Retrofit, and Reconfiguration

April 24-26, 1978
Columbia University
New York, New York

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Foreword

Among priorities of the National Center for Health Services Research (NCHSR) is the formulation of research strategies and programs that focus on the solutions to problems of State and local health agencies faced with "front line" health planning. The intent of this conference, supported with a grant from NCHSR, was twofold: (1) to provide a forum where experienced policy and program level health professionals in health planning, health administration, architecture and construction could discuss critical issues concerning the recycling of health facilities and (2) to recommend significant areas of health services research associated with those issues.

The catalysts for an intensive examination of these issues are the radically changing nature of patient populations, the appearance of new technological advances in methods of providing health services, and the incessant escalation of the costs of new health facility construction.

These proceedings document the deliberations and recommendations that emanated from the interaction between the panelists, who were selected for their extensive involvement in major health facility recycling efforts, and the conference participants who were representatives of the American Institute of Architects, the American Hospital Association, and Federal, State and local health planning agencies. The conference, in its efforts to meet its first objective, was considered a success. The second objective, of course, involves translating the ideas and recommendations coming from this conference into functional research questions, able to produce results that are consequential in health planning decisions. These proceedings are distributed with the intention of informing the health care community of what the conference participants consider to be the critical issues, and what will be given consideration in the formulation of NCHSR's research strategies and priorities.

Gerald Rosenthal, Ph.D.
Director
February 1980

FEB 1 3 1980

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A special thanks must go to Steven Jonas, M.D., M.P.H., my co-principal investigator, who really initiated the preliminary discussions that resulted in this project; Joseph Sprague whose active participation, interest and experience through the A.H.A. helped turn our plans into reality; Frantz Wilson, Project Officer at NCHSR, who coordinated the agency's support of this conference; and Grady Smith, who played a triple role as reactor, member of the planning committee, and coordinator of support from the Bureau of Health Planning and Resources and Development. (Now the Bureau of Health Facilities, Financing, Compliance and Conversion.)

There are many people who put in long hours of hard work to ensure the success of the project, but I would particularly like to thank:

Dorrine Veca, my secretary and administrative assistant, and Michael Jordan, for his graphic design.

William Parker Jr., A.I.A.
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Introduction

Existing health facilities are continually being updated, recycled, remodelled, renovated or reused to meet changing health care needs. Centuries-old long-term care facilities were reused as acute care facilities when effective treatment techniques became available. Early acute care facilities became long-term care facilities as the population's need for long-term care increased. Hospital nursing school buildings were turned into administrative offices as live-in nursing education programs gave way to baccalaureate degree programs. And today, inpatient nursing facilities are being recycled as ambulatory care facilities.

At the same time, buildings originally constructed for purposes other than providing health services have been converted to health care uses. Factory buildings have been made into hospitals and neighborhood health centers. Many a village has seen its first hospital appear on the second floor of a main street building housing the local pharmacy, or in one of the larger private homes. In larger cities, district health centers and dispensaries have been built into brownstone residences or apartment buildings. General purpose office buildings have been converted into medical arts buildings, group practices, or Health Maintenance Organizations. All of the above activities are in addition to the much more common, and in some hospitals almost constant, renovation of existing spaces: to modernize, serve new needs, expand or contract services.

Neither reuse nor renovation for health care buildings have been thoroughly studied, as relatively common as both activities are. At the present time, two of the most serious problems faced by the American health care delivery system are the linked ones of continually rising costs and a surplus, in certain parts of the country, of general hospital beds. At the same time, there are increasing needs to expand certain kinds of health services presently in short supply in many areas: ambulatory and primary care; long-term care; care for the aged, rehabilitation; community mental-health and substance abuse; personal preventive care. It is likely, therefore, that health facility reuse is an activity which will become increasingly common during the rest of this century.

When considering facility reuse as an activity, a number of questions come to mind. How does one judge that a health care facility is a candidate for reuse, or that a non-health care facility is a candidate for conversion? When a decision is made to provide a new service from a particular institution, is it cheaper to recycle an existing building, or to build anew? How does one determine if a reuse project is financially feasible? How will existing codes and standards affect the project? How does one decide if an existing health care facility should be recycled or simply torn down? How does one apply the principles of architectural design to the reuse of existing health care facilities?

There is much experience but little literature, and less organized scientific research into these problem areas. In the spring of 1977, the faculty of the Health Services Planning and Design Program of the Columbia Graduate School of Architecture and Planning decided that the initial step required to organize a research program into health facility reuse was to hold a conference to bring together people from the disciplines of architecture, health services administration, and health services planning, with experience and interest in the subject area. The principal objectives of the conference would be to provide for an exchange of experiences and to develop an organized research agenda for future work in health facility reuse. The conference was supported by a grant from the National Center for Health Services Research Office of Health Research, Statistics, and Technology, DHEW, and was co-sponsored by the American Hospital Association. The Conference on "Health Facility Reuse" was held in the Conference Center at the Graduate School of Architecture and Planning, Columbia University on April 24-26, 1978.

This document is the final conference report and is divided into five major sections. First is the Introduction and Conference Format. Second, are the introductory speeches which describe the basis for the conference, the interests of the National Center for Health Services Research, and the breakdown of critical issues. Third is the critical issue presentations, reactions and research recommendations. Fourth is the concluding presentation paper, "Future Directions in Health Facility Reuse." And, fifth is a list of the Reuse Project Design Award Winners. There are also three Appendices: I includes the list of Participants and the Conference Schedule; II presents the Participant's Evaluations of the Conference, including the Evaluation Form, and the Summary of Partici-

pants' Comments; and III is a bibliography prepared by the American Hospital Association, and additional references.

Conference format

The planning and development of this conference was performed by the Principal Investigator and Co-Principal Investigator, in close association with a planning committee whose names and organizational affiliations appear on page 88 of these proceedings. The general format agreed to was the selection of one expert in each of six critical areas to prepare a position paper to which one or more persons were asked to prepare a formal reaction.

The several position paper authors, the reactors, and invited guests then spent time in small group discussions undertaking the work of the conference. The conference format began with this arrangement but also added something different. The conference was opened to the general health services public through announcements and direct mail. Registrants, who were not panelists or reactors, were given the opportunity to participate in the work of the conference by joining discussion groups, or "Critical Issue Panels" as we termed them. Thus, we had a conference within a conference, hopefully with the advantages of both, the small group research conference and the larger public conference, and with the added feature of providing registrants with the opportunity to contribute to the work of the invited speakers, reactors, and guests. The conference's six Critical Issues Committees were:

1. Financial Feasibility
2. Codes and Standards
3. Systems Approaches
4. Project Implementation
5. Planning Strategies
6. Facility Evaluation.

The list of participants and the conference schedule are contained in Appendix I.

The first day of the Conference was taken up with an orientation session and luncheon for the invited guests, registration, and the formal opening of the conference with the Keynote Address delivered by Gerald Rosenthal, Ph.D., Director of the National Center for Health Services Research. The second day began with a presentation, "Identifying the Critical Issues," by Co-principal Investigator and Project Director William Parker, Jr., A.I.A., establishing the context for the committee sessions and conference products.

A third speech, "Reuse of Facilities for Health: An Overview" by Joseph G. Sprague, Director of Design and Construction at the American Hospital Association, presented the views of the American Hospital Association, who co-sponsored this project. The group then divided into the six Critical Issues Committees, with a panel of invited participants consisting of a moderator, presenter, and reactors, and with other committee members selected from the open registrants.

In each committee, the presenter delivered his paper, followed by prepared remarks by the reactors, and then by open discussion by all committee members. There were three panel sessions during the day, of 1½-2 hours each. The panels had as their principal assignments the development of a list of major policy issues and a research agenda for their subject area. At the conclusion of the work of the second day, it was expected that the invited guest members of the panels would take the results of the day's work and prepare material for presentation to the plenary session of the conference scheduled for the third day. Most panels in fact did this. However, the whole membership of the Panel on Facility Evaluation became so heavily involved in its work that they met together well into the evening to hammer out their position.

On the third day, the moderator of each Critical Issue Panel made a presentation to the conference in the plenary session which (1) summarized the major paper presented in his panel, (2) summarized the reactor's remarks, (3) reviewed the main points made during the course of the general discussion and (4) presented the policy and research agendas developed by the panel. An exhibit of health facility reuse projects was on display throughout the conference. On the final day, Health Facility Reuse Design Awards were presented to the submitted projects which were judged to be the most distinguished by a select Design Jury. The final item was the closing address, "Future Directions for Health Facilities Reuse," by Steven Jonas, M.D., Conference Co-principal Investigator.

Keynote address

Gerald Rosenthal, Ph.D
Director, National Center for Health Services Research
OHRST, DHEW

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Over the past decade, our perceptions of the requirements of the health care delivery system have undergone considerable changes which, in turn, has had a major impact on the configuration of the system. The impact of this change on older health facilities now faced with obsolescence heightens the need to develop new strategies which will broaden the options available for their use.

Creativity within the health care delivery system, as in other areas, seems to be measured against a set of cultural norms. However, these norms tend to impose limitations rather than encourage creativity. Twenty years ago, a number of perceptions on the structure of the delivery system existed which over the years have significantly influenced its development.

First, the hospital setting was perceived to be the focus of the delivery system. A hospital-centered "formula" for the delivery of care appeared to be established, and within this context, primary, secondary, and tertiary care were codified. Growth occurred in the form of additive strategies, with increases in capital investments and new medical technologies concentrated in the hospital, particularly the inpatient setting.

Second, there was no operational or conceptual understanding of the linkage between the financing and reimbursement system and the choice of technology, or the cost of care. In these respects, no perception existed of the relationship between activities in the operational setting and health policy.

Third, our inability to succeed in the effort to prevent disease and ill health was attributed to a lack of adequate investment in health resources. The perceived solution was greater capital investment in the system and the acquisition of more technologies.

Finally, health planners were not faced with the question of efficient allocation of resources which has become a major concern today. With the population rapidly increasing, allocation problems were more readily remedied by growth and expansion. The population was moving, new cities were being established, and new suburban communities were emerging. However, there was a lack of awareness that with the shifts in growth patterns, some areas were faced with shrinking populations, and that the rate of growth might decline.

There was no perception of the change in the product mix or that the system was rigidifying around a technological concept which might not stand the test of time.

The concept of retrofit, reconfiguration, and reuse of facilities is essentially a strategy to provide more options for making decisions on the allocation of resources. New strategies will need to be developed based on a different conceptual understanding of the system than that which has been influential in developing additive strategies.

Today, with the rapid rate of change in the delivery system, the criteria for flexibility is of increased importance. More choices are needed in the system, and in view of this need, the reuse of facilities for different health and non-health purposes may be the most critical of the alternatives available for recycling facilities.

Furthermore, a number of new options are becoming legitimized in the system as the product mix changes, and consequently, our expectations of facilities are changing. For example, the system is shifting from the hospital setting toward increased emphasis on ambulatory care. There is a sense of the growing importance of rehabilitative medicine and its related activities, and a rising sense of the need to reconsider strategies for long-term care.

Some interesting innovations are taking place within the system which may provide a different range of choices, and a significant amount of change and shifting is occurring which has not been evaluated. A number of experiments are being tried with single facilities of various types and in different settings. Systems development strategies are being explored for use in making decisions on the possible alternatives for change within multifacility systems.

At the same time, there is a rigidity within the system which resists efforts to change. One of the major reasons is the social existence of the facility as part of the community and an interest of the local governing body. Resistance to change, however, is in part due to the absence of information available to the decision maker on alternatives.

If the notion of a rigidly structured system can be dispelled, a timely challenge awaits us to explore how much flexibility is in the system and what can be achieved with it.

Identifying the critical issues

William T. Parker, Jr., A.I.A.

The continuing increases in health care and construction costs have created an economic environment in which our abilities to meet new or changing facility needs are severely restricted. The resulting lack of flexibility in how and where services are delivered may, in fact, be contributing to rising health care costs. In many regions we are simply locked into an inefficient configuration of existing resources. From a planning perspective, the greatest potentials of reuse strategies are in the increased ability to solve maldistribution problems. From a capital cost perspective, we have reached a time when new facility needs may have to be accomplished through the efficient use (or reuse) of existing facility resources. Although totally new buildings will continue to be constructed, the demand for the efficient recycling of existing facilities has already increased to the level that any architect active in the health sector rarely sees a totally new facility project.

The REUSE of existing structures to meet new or changing health facility needs could reduce the amount of capital investment required in facility resources, and thus reduce the total cost of delivering health care services. The savings could be threefold. First, the direct construction cost of a project could be reduced. Second, a lower total project cost would reduce the cost of financing. And third, there would be increased potentials for the redistribution of existing services, particularly in urban areas, to improve the efficient delivery of care. Circumstances which further define the need for an in-depth investigation of reuse in health facility construction can be summarized as follows:

1. *Changing Methods of Delivering Health Care,* brought on by changing needs for services, demographic shifts, epidemiological and technological advances, are making new demands on existing health facilities.
2. *Rapidly Increasing Costs* in all sectors, but particularly in the health sector, are limiting access to care, and restricting the ability to upgrade existing facilities to meet new demands.
3. *Facility Obsolescence* is occurring in a large portion of the existing facility inventory, with many services being delivered in inefficient and/or unsafe environments.

With increasing demands and pending legislation for cost containment, the review of all capital expenditures will continue to tighten. The fact is, however, that we still have inadequate criteria to evaluate additional capital investments. There is very little documentation of the actual cost (long-term, short-terms, direct, and indirect) of providing specific services in various facility types. Even less is known about the impact of additional capital expense to expand or renovate existing facilities. Currently, reuse/retrofit projects are accomplished on an ad hoc basis to such an extent that they threaten the conditions which have created the need. In some cases reuse may be less cost effective than higher forms of capital investment, and in other cases sound structures which could be very suitable for less intensive levels of health care delivery are demolished.

Architectural and planning expertise has to be focused on the task of maximizing existing health facility resources. With increasing rates of change in how care is delivered, new facilities can become obsolete even before they are occupied. A clear need exists for efficient methods of delivering more appropriate facility types, and for achieving upgraded spaces faster and less expensively.

The following trends illustrate the complexity and extent of the need for more rigorous methodologies and innovative approaches for the reuse/retrofit/and reconfiguration* of existing facilities.

1. *Ambulatory Care*
   The shift from inpatient care to outpatient ambulatory care is requiring hospitals to provide new space for these services, either through the addition of new structures, or through the reuse of existing space. The choice of action (whether new or reused space) must be based on a consideration of all costs and all benefits; although one action may be more costly, its net

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* Definitions:

Reuse: The reassignment of specifically planned facility resources to other functions or uses.

Retrofit: The replanning and refitting of outmoded facility resources so as to meet current requirements for safe and efficient utilization.

Reconfiguration: The reorganization of a system of existing facility resources to satisfy new operational and financial needs.

benefits may be greater. In many cases we simply do not have the criteria or data necessary to make these decisions.

2. *Critical Care Nursing Services*
The shift toward ambulatory care has been accompanied by a growing number of critical care nursing services. At the same time, reductions are being called for in short-term acute care beds, thereby setting up a logical reuse potential. However, the conversion of existing acute care nursing areas to critical care spaces requires complex reuse design. Optimum planning is difficult to attain using the methods and concepts developed in new facility design experience. For example, placing a new ICU into an old acute care nursing unit is a very complex design problem. One is faced with a space that is long and narrow, while the new functions require a configuration that tends to be almost square. The resulting design will inevitably be a compromise solution. Innovative design approaches are required to deal with the structural and functional limitations of this type of project.

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3. *Technological Advances*
The rapid evolution of sophisticated diagnostic and treatment services has resulted in a state of continual change in all hospitals. The estimated useful life of new radiology equipment can be as short as 6 to 9 years. As new equipment and procedures are developed, the need to install them in existing buildings tends to increase. However, uncontrolled retrofitting of existing services has dramatically increased the capital investment in existing facilities. This not only limits future changes, but also has contributed unnecessarily to increasing health care costs. Aggressive management techniques need to be applied to both fiscal and physical resources to ensure the continued affordability of high quality care.

4. *Aging Stock of Existing Facilities*
Hospitals constructed during the early years of the Hill-Burton program are now 30 years old, approximately 10 years from the age at which they are expected to become obsolete. If 40 to 50 years is a reasonable expectation for the useful life of a building, then how will facility needs be met in 10 to 15 years? Furthermore, what will be done with the vast collection of facilities which the prolific Hill-Burton program built all over this country? A very critical period for a large number of existing health facilities is rapidly approaching.

5. *Building Codes*
It is generally accepted that the United States is oversupplied with short-term general hospital beds. It is also generally accepted that, whatever the size of the excess within the system, an equal number of beds may be considered non-conforming to current standards of safe occupancy. A 1973 study by the U.S. Public Health Service estimated that approximately half of the non-conforming beds in this country, as many as 100,000, failed to meet minimum safety standards of fire resistant construction.

Rigorous building codes written to satisfy public needs in a time of new construction, have improved the fire and life safety conditions in new health facilities. However, many of these codes are retroactive, and if an institution improves any portion of its building to meet increasing demand, (let's say for ambulatory care) then codes may require that the entire facility be upgraded. In many cases, the simplest response to new requirements can generate costly unanticipated facility change. The prohibitive cost, both direct and indirect, of retrofitting facilities with new mechanical and electrical safety systems can render a logical reuse application financially extravagant. Not only are efficient methods of updating older buildings to levels of safe occupancy needed, but we need to continue to evaluate and re-define adequate levels of safety in various settings.

6. *Energy Costs*
Of all the pressures for renovation today, the need for more efficient energy systems probably represents the greatest potential for reducing operating costs. In an article by William J. Taylor in the February 16 issue of *Hospitals*, Journal of the American Hospital Association, it was reported that the Hospital Association of New York State estimated that from 1975 through 1977, fuel costs increased by 23 percent, and that they would increase by approximately 9½ percent for 1978—a 35 percent total increase for 1975-1978.

Obsolescence and reuse

Facility obsolescence can be measured in many ways. Institutions with a poor functional organization of departments may not be able to efficiently meet the new demands created by increased ambulatory care. Obsolescence can likewise result from the inability of a facility to change in order to meet the evolving needs of its changing service area, or its inability to respond to demographic shifts within its region. From a planning perspective, obsolescence can be measured by a state of imbalance between the available supply of services and a community's need for those services. A condition of oversupply, or undersupply, can therefore be an indicator of obsolescence.

Unfortunately, it is fairly common to find both oversupply and undersupply existing simultaneously. Any number of communities may have an oversupply of highly sophisticated diagnostic imaging capabilities, and a drastic undersupply of primary health care services, well-baby clinics, or family care group practices. Many communities have an oversupply of short-term acute care inpatient nursing services and at the same time, a shortage or a need for additional physical medicine and rehabilitation services.

These are examples of some of the more obvious and common imbalances that exist all over the country, and

it is this condition of oversupply/undersupply where the "Reuse" concepts deserve detailed analysis. Other applications will be important, but I believe that the greatest impact for reuse strategies will be where they help solve imbalances in the current distribution of existing services, and improve facilities utilization.

Conclusions

The pressures on the health care delivery system in this country are enormous. The increasing rates of change have rendered well-conceived facilities plans totally unfeasible. Who could have guessed 10 years ago that the CT scanner would have replaced the cobalt therapy room as a leading controversial issue? Ten years from now, will CT be among the highly sophisticated services only provided at major teaching institutions, or will it become a front line diagnostic screening tool in community hospitals and ambulatory care centers?

There are a number of very powerful organizations that will affect the future of health care delivery, not the least of which are the insurance companies and reimbursement agencies. With the cost of inpatient care over $200 per day in many regions of the country, and with Congress discussing cost containment and national health insurance legislation simultaneously, the prospects for dramatic shifts in the health care delivery system over the next 10 years are almost certain.

Research must be undertaken in several areas if our facility system is going to successfully respond to today's changing demands. This conference has been divided into six critical issue committees to develop research agenda in the following specific areas.

Financial feasibility: An institution's ability to service its debt is not an adequate measure for evaluating the impact of proposed facility construction projects. Rather than "financial," we should be preparing "economic" feasibility studies which relate the proposed health service institution to the economic structure of the community being served. A hospital is not only a provider of essential services, but is also an important consumer of services and an economic and employment base. Any health institution should be considered as an infrastructural system within its community, and therefore, health planning should be directly related to other social and economic planning for community development.

The increasing cost of fianancing health care construction is placing restrictive burdens on the renovation or updating of existing facilities. With the increasing percentages of debt financing, the use of existing land or structures as equity in the financing of reuse projects could have a significant impact on the total capital cost of building programs. At the regional level, the aggressive management of fiscal and facility resources could significantly affect the cost of health care simply by reducing the cost of financing. Research on the potential financial impact of reuse concepts should focus on techniques for managing existing facility resources at the regional and institutional levels.

Codes and standards: We have reached a point in the development and administration of building codes and design standards that they are limiting innovation in health facility design. Some of the community hospital designs being developed by the Oxford Regional Health Authority in England are reinvestigating some "ward" concepts for inpatient nursing. These current attempts to improve the delivery of nursing care have resulted in rather open designs, with six bed wards clustered around an open nursing area, backed up by six to eight private rooms. These plans are accomplished in about 150 square feet per bed, which is less than half the space that would be required in this country. The point is not that these designs are better or worse than the predominantly private room designs used in this country, but with current regulations limiting multibed rooms to four beds, these new ideas cannot even be attempted here.

Research on building codes must look at redundant, and even contradictory code provisions, and the inconsistencies of code administration or enforcement. We need to re-evaluate the purposes of codes and building standards. Is our goal to provide accessible buildings for safe occupancy, or do we want to proscribe detail spacial organizations related to functional requirements? The retroactive compliance of new code provisions on older facilities can place severe financial burdens on those institutions, rendering them obsolete. This powerful regulatory technique needs to be administered in a consistent and equitable manner.

Systems approaches to retrofitting: The solutions to many of the code compliance problems are within the domain of the Systems Approach Committee. An efficient construction method for installing fire sprinkler systems into existing hospitals would solve one of the most pervasive problems forcing the construction of many new facilities. The lack of adequate fire safety systems is the leading cause for facility obsolescence. Creative solutions are needed which will allow the efficient retrofitting of mechanical and electrical safety systems, ventilation and/or air conditioning systems, additional or upgraded elevators, and other communication and movement systems.

Most of the recent systems studies developed in this country have been biased by an overriding concern to reduce the costs of new construction, either directly or by reducing the required construction time. Consequently, most of the available techniques and systems will not accommodate the limitations of older, low-technology structures with low floor-to-floor heights. The *Veterans' Administration Hospital Building System Study* was a leader in the field, but typically, it focused almost entirely on new construction. The profession seems to be stuck in an era of reproducing the interstitial space solution, developed by Louis Kahn in the 1950's. We need to

turn our attention toward the reuse of existing structures and develop systems which will accommodate the every day needs of small, segmented change, and do so efficiently.

Project implementation: One of the greatest concerns for any hospital administrator faced with the prospects of renovating his existing facilities is the potential loss of revenue during construction. The lost revenue from closing a portion of a facility represents an important indirect cost of a reuse construction project, and is seldom considered until the architect is trying to develop a phasing plan for the construction. Construction scheduling and project management techniques must meet the particular demands or reuse construction. The uncertainties of "as-is" conditions usually result in very conservative budgeting and estimating, and often precludes the investigation of innovative solutions.

Managing the design and construction processes in reuse applications may be best accomplished with an arrangement somewhere inbetween the Construction Management approach, and the Fast-Track or Design/Build approaches. Negotiated contracts are rarely acceptable to builders, and cost-plus is usually not acceptable to adminisrators. Innovative application of the private developer approach has been successful on a limited scale, however additional research is needed to determine its broader applicability.

Planning strategies: The application of reuse strategies in the health care delivery system must be coordinated and directed by the Health System Agencies (H.S.A.'s), and therefore, logical methods of integrating potential reuse projects into health systems plans and annual implementation plans must be developed. The greatest potential impact of reuse strategies may be as an approach to help solve maldistribution problems, and in attempts to optimize the utilization of existing facility and program resources.

Before any of the above can occur, we must get a better idea of "what we've got," and "how it's being used." Regional inventories of existing facility resources, their condition, their utilization, and the potentials for reusing those facilities would provide the H.S.A.'s with more options in configuring available resources within the existing delivery system. Additional data is not what is needed (we essentially have all the information on existing facilities), but the existing data must be analysed and managed with the goal of optimizing facility resources or capital investments at the regional level.

Facility design: Methodologies need to be developed to evaluate the potential for reuse projects and the quality of the completed environments. A logical strategy requires that explicit criteria be established and used to evaluate the reuse potentials of existing buildings. An additional level of concern should focus on the quality of the resulting designs. Even successful reuse projects often seem to lose a certain warmth and personal scale. Architects and planners must investigate new ways to deal with these and related problems.

Final thought: We have reached a stage in the development of our health care delivery system where adjustments are needed in the configuration and utilization of existing capital investments. This conference should focus on strategies to maximize the utilization of existing facility resources to meet new or changing health care delivery needs, rather than methods of continuing to generate new resources.

Reuse of facilities for health: an overview

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For years the health care delivery system in this country has been expanding, to the point that there is now a growing concern that we have overbuilt, and in general overloaded the system. Expansion and the resulting economic effect on the health care community has made many bad decisions look good. Growth and expansion have a way of covering up misconceived and improperly planned health facilities. What happens now that the cycle of expansion has turned into a cycle of contraction? What do we do with all of those building resources, good or bad, that we added to the system and now are alleged to be under utilized? Maybe we can reuse them.

The American Hospital Association has supported the concept that a health facility is and should be the most advanced, up to date, quality built environment possible with available resources. The AHA has developed programs to advise member hospitals on how to most prudently retain the capabilities and manage the processes of planning, design and construction of such an environment at a reasonable cost. One of these programs is the cosponsorship of this conference on "Health Facility Reuse."

With the recognition that there are many barriers to reusing a health facility, a process to identify the key issue areas was the first step in planning for this conference. There was no preconception of the outcome, or the amount of consensus or controversy that might exist in the field. We did, however, perceive a number of areas that should be considered in analyzing the reusability of a facility for health care.

The first step was to answer the question, "Why would anyone want to reuse a building"? The first answer that seemed most apparent was "economics." A business can certainly maximize its reasons for existence (i.e., profits, etc.) if it can more economically manage its assets. This management, however, must include both short and long range benefits. When looking at a health facility, the capital cost of construction for a new building equals its operating cost in 18 to 30 months. Therefore, any plan to reuse an existing building must quickly take into consideration any functional or operational compromises that might be a result of the limitations in an existing structure. It may be more costly to reuse than to replace. On the surface, the economics of reuse construction could lead to the conclusion to forget about reuse.

But assuming that we can economically justify the reuse of an existing building, what are some additional barriers that must be overcome. How will the reuse design enhance other components in the health care community? Will it add to other community goals such as improving social and economic conditions? Will it adequately provide the state-of-the-art in medical care (or is a compromise acceptable)? Can the facility provide a quality, safe and secure environment? To answer these questions, what do we set as our standard? What do we compare the reused facility to? If the comparison is made with what would be required in a new building, then we may gain some insight into evaluating the viability of reuse. Let's look briefly at the six critical issue areas: financial consideration, codes and standards, building systems, project implementation, planning, and design.

Examples of financial feasibility studies for new construction in comparison with renovation show a number of areas for cost considerations. While savings can usually occur through reduced costs for land and structure, increased cost could be incurred for demolition and professional fees to offset higher engineering and design cost. More time is normally required to design, demolish, and construct a renovation project than would be required to build new, thus delaying the potentially earlier operation provided by a totally new facility. The increased cost of money in conjunction with the delay in revenue could be substantial. Controlling construction costs has relatively little impact since capital cost is relatively low in comparison with operating cost. Financial feasibility analysis required that capital costs be calculated over the expected life of the building, and the potential operational savings also be identified. This approach is essentially a life cycle cost analysis and should form the basis for any financial feasibility study.

The issue of codes and standards could yield very clear differences in requirements for new vs reuse. For instance, in construction of a new health facility, it is often much easier to set the parameters for meeting all appropriate standards and dealing with them through the design and construction phases than if you were given an existing plant with the mandate to change the function within that plant and have it meet all new code requirements. The latter would be the case when

substantial modernization, renovation or change in occupancy classification is made. Even with the increased use of equivalencies, waivers and variances, specific code requirements could preclude a very strong design direction. It is a logical assumption, however, that the resulting reused building should provide the same level of safety as the level of safety provided in new construction.

Using a systems approach in health facilities construction has been receiving greater attention. The building systems including structural, electrical, HVAC, etc., are being packaged in such a way as to provide greater adaptability and flexibility of design. Currently it is very difficult to justify and retrofit building systems in an existing facility for reuse purposes. The systems should generate the space needed, rather than the space available generating the system itself. A systems approach, however, will yield a greater opportunity for reusing buildings currently being designed.

The perspective on the way health facility projects are delivered is changing. The use of today's sophisticated management and organizational techniques for construction completion can save time and money. Most of these construction processes deal with accelerated fast-track construction and design/build techniques. The successful examples of these approaches have mostly been with new, expanded or replacement facilities. The adaptation to reuse, however, is questionable. It is important that each of these techniques be closely evaluated, defining their advantages and disadvantages as they would apply to reuse.

In the planning of health facilities, the concept of regionalization and shared services is widely accepted, as is the notion that unneeded construction should be avoided. Both of these concepts are apparent in the intent of today's planning legislation. When determining the appropriate planning strategies for inter and intra-institutional plans, the concept of reuse should be considered as a possible alternative. The guidelines and criteria for making such judgment from a planning standpoint are very limited. Therefore the judgment from the planning strategies' standpoint must take into account the evaluation of reuse on an individual project basis. How this is done and how the rules should be structured to accomplish this purpose is unknown. What is clear is that planning agencies must evaluate reuse on an individual basis and that making determinations based on some arbitrary average program, design, feasibility or cost would be a mistake.

Finally the methods of design and facility evaluation as a comparison for reuse is affected by all of these issue topics. As various parameters are generated in making decisions about design differences, the reuse concept opens an alternative that may heretofore not have been seriously enough considered. The ultimate comparison of reuse versus new is in the actual facility design. What the savings are, what the advantages are, and what the resulting benefits are will ultimately be evaluated in the final design. It would be a mistake for subjective, arbitrary or less than well founded decisions to generate design parameters.

Conclusion

Existing conditions today show a scenario of social, economic and political environments that don't provide much incentive to reuse existing buildings. When reuse leads to economic gains or social gains, a clear justification becomes apparent. There may need to be legislation to provide an incentive for reuse. An existing health facility may anticipate a savings of 10-20 percent on capital construction costs through reuse, but over the life of the building it may in fact cost more than new construction. Costs associated with interim facilities, renovation time, staffing time could be too great in the short run. In the long run operational costs could suffer. If a $10 million reuse project saved 10 percent of the projected new construction cost over a 20-year period the savings would be a modest $50,000 per year plus financing costs. With potential operating cost penalties resulting from possible compromises in design, the decision to reuse could result in additional cost over the long term. If we begin today to design all new construction with flexibility and adaptability in all systems we may be in a better position in the future to reuse than we are now with our existing buildings. With over 65 percent of the cost of health construction included in engineering, mechanical, electrical and HVAC systems, the savings could be greater than any savings possible with our current inventory of health facility designs. The question of reuse, therefore, may be a matter of time. This conference on "Health Facility Reuse" has given us all an opportunity to discuss the important issues in order to better evaluate the question of reuse versus new construction.

Critical issue panel on financial feasibility

1. Position Paper by Mark S. Levitan
2. Reaction by George Adams*
3. Summary and Recommendations by Frederick B. Putney, Ph.D.

* Note: Mr. Joseph M. Giglio was to be the second reactor on this panel, but he was unable to attend at the last minute.

Financial feasibility of health facility reuse

Mark S. Levitan and Brian P. Lenane

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With the tremendous increase in health care costs over the past two decades, the public, legislators, health care providers and others associated with the health industry are expressing greater interest in cost containment. The amount of capital expenditures for construction of health facilities appears to have increased at an extraordinary rate, particularly over the last fifteen years,[1] while general construction costs have doubled.[2] With this background the essential question to be answered when investigating the reuse of existing facilities is: Will the cost of renovating a facility be less than the cost of building a new facility?

The hospital administrator is confronted by a changing patient population, growing reluctance on the part of the area planning agencies to approve new construction, rapid evolution of hospital design which obsolesces a hospital building designed a generation ago, and the reluctance of board members to demolish obsolete health facilities for sentimental rather than business reasons. No matter how one looks at the situation, there is a real need to examine the financial feasibility of recycling existing health facilities.

There are both systemic and fiscal factors which impact upon the feasibility of health care construction. The issues related to financial feasibility of construction and renovation of existing structures are not well understood in the health field. An examination of these issues is both appropriate and needed. Such an examination should consider not only the actual project and construction cost of renovation, but must also consider the reality of an institution's ability to secure financing for the project.

The basic question to be answered is this: assuming all nonfinancial factors roughly equivalent, is it less expensive to construct a new facility or to reuse or renovate existing space? For the purpose of this financial comparison, there must be an examination of the differences between new construction and renovation projects leading to a facility of the same quality, function and capacity. Cost factors, not only for the initial capital investment, but for total life cycle, should be studied.

Financial feasibility is more than a paper exercise to be performed by accountants. Financial feasibility means structuring a financial package so that an institution can secure full financing for a proposed project and can then, over the useful life of that project, repay any debt incurred in constructing the project while, at the same time, meeting full operating costs. Financial feasibility must consider both the market environment and the financial details of a proposed project. To determine the demand for services at the institution, "it is necessary to evaluate the demography, utilization rates, patient flows and competing hospitals within the institution's service area. Once this service area demand is established and a market share is estimated for the specific institution, the focus of the study is that of determining whether or not the estimated demand is sufficient to support the required level of debt." [3] The importance of an analysis of the market cannot be overstated. No matter how good the projected financial statements look, if there is no real demand to support the project, it will not be financially feasible.

With this broad framework in mind, the categories of costs that may be part of a major construction project should be examined to understand in what way they are unique in renovation or reuse. A list of such costs should include the following:

1. land costs,
2. planning and programming costs,
3. architectural fees,
4. interior design fees,
5. engineering fees,
6. construction costs—this would be further subdivided by trade breakdown;
7. legal costs,
8. project management costs,
9. financing costs—including commissions, broker's discount, legal and accounting fees and costs associated with securing financing;
10. implicit costs—not normally recorded such as implicit interest on existing capital, time and effort of management and other entrepreneurial costs;
11. equipment and furnishing, and
12. inventory and supplies.

An expensive literature search conducted on both a local and national level revealed very little data on the financial feasibility of health facility renovation. For the

record, a wide variety of related subjects was examined in the following sources: *Hospital Literature Index* (1965-Sept. 1977); *Medical Socioeconomic Research Sources* (1971-1977); *Weekly Government Abstracts—Health Planning* (June 1975-1976). The National Health Planning Information Center (DHEW) conducted a search of its data files. Both research efforts yielded very disappointing results. The information that is available is largely anecdotal and comes from practitioners within the field.

The land on which an existing facility is built may represent a substantial investment in current economic terms for an institution. The ability to use the existing site, without the need for further investment or liquidation costs, may be a major advantage in the decision to renovate. The value of land is normally higher in metropolitan areas than in the suburban or rural areas where land is more readily available and building or zoning codes are not as restricted. The location of the site also impacts upon the flexibility of design. If the new facility is to be built in a congested urban area, the building design is likely to be confined to the foundation of the existing building because of limited space, high real estate costs, and utility clearance requirements. In such a situation, the incentive is to use the existing building where possible because new construction cannot get more horizontal space. The use of existing land may also represent a substantial equity that can be leveraged in securing financing for a renovation project.

Architectural and engineering costs reflect, largely, the amount of time required by the professionals to complete an individual job. Within given market areas, rates for service tend to be roughly competitive. Discussions with a number of professionals in the field indicate that the fees required for renovation will be 30 to 50 percent higher than fees for new construction for similar facilities.[4] The higher fee represents the complexity in dealing with existing facilities and, therefore, the more time needed to prepare adequate construction documents.

The largest savings from the renovation of hospital facilities appears to come from lower construction costs. Maximum savings to be realized in total construction cost are in the neighborhood of twenty percent, resulting principally from the total or partial reuse of existing structural, mechanical or electrical systems. In an effort to document these conclusions, construction estimates were obtained from the Turner Construction Company for the construction and renovation of a hypothetical general hospital (see Appendix I). The potential construction savings are $16.00 per square foot for a renovation project, or 6.7 percent of the total project costs. The potential construction savings may be offset by higher architectural and engineering fees. The inherent risk of cost estimates for reuse construction results from the deviations which often occur during construction and are never recorded on "As Built" plans. In new construction, the engineering tolerances, materials and design of the building are known beforehand; but in reuse construction there are many surprises. The inaccuracy of construction estimates has been allowed for by Turner Construction through higher contingency allowances.

There does not appear to be evidence that other costs in a project are substantially different for renovations or new construction, except to the extent that a total financing package may be reduced because the renovated project is less expensive than a new project. If so, fees or commissions or other costs related to the size of financing renovations would be reduced, and there do not appear to be any significant savings.

A factor that may enter into financial considerations is the character of a proposed project compared with the existing facility. Renovation of a hospital or portion of a hospital to a less intensive use, such as a nursing facility or office building, may result in substantial savings because mechanical or electrical requirements are much lower. Conversely, there may be circumstances in which the upgrading of a facility to a higher or more intense use may also be less expensive than building new, although most professionals believe this to be the exception. Examples of upgrading would be converting acute care hospital beds to critical care beds, or upgrading nursing home facilities to acute care hospital facilities or converting office space to laboratory space. The question would be what unique mechanical and electrical and, in some cases, structural needs were required to upgrade the structure. There do not appear to be any published or accepted guidelines to help in this determination.

Upgrading can require more expensive construction than in a typical renovation, which may eliminate the potential construction savings while incurring higher engineering, architectural and contingency fees. These additional costs could make new construction the less expensive alternative. Since upgrading renovation has been done in the field, there must be some financial and/or non-financial reasons which make such a project feasible. These factors could include severe limitations on additional land or the scope of projects undertaken compared to total institutional size.

There are other matters that may be considered social costs which do not typically enter into the determination of financial feasibility for specific projects. Such costs would include those related to an inappropriate or maldistributed supply of services, inappropriately located facilities, non-accessibility to certain portions of the patient population, inappropriate or excessive resources committed to high cost services and the over-use of services. These social costs may be considered by the institution in fulfilling its mission, but they are issues that are typically addressed within the health care environment by an organized planning process, including major consumer participation and a decision making process beyond the control of any one institution.

There are a number of other factors which may affect the feasibility of a renovation project that are not included in traditional studies of financial feasibility. These

factors include, among other things, opportunity costs, availability of financing, start-up costs, life cycle costs, reimbursement considerations, and social considerations.

If renovation disrupts an existing operation, then there could be lost revenue. Lost revenue during construction can be grouped into two categories: the time cost of money, and lost opportunity costs. When an existing building is closed for construction, the revenue presently generated by the institution will be forfeited. The opportunity to obtain revenue from the facility has been lost until the completion of the project. While this is not an out of pocket cost, it is an economic one and should be addressed.

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The time cost of money concept involves the discounting of cash flows over time. If a renovation can be done without closing the entire facility, the revenue from the operating portion of the building can be used to pay for current expenses. If the renovation requires that the existing building be gutted, then demolition and new construction which is often a faster process should be considered. A new facility can be put into operation more quickly and, therefore, generate cash more quickly. When services are disrupted, there is a continuing lost opportunity because of a diminution of the institution's market. If services cannot be provided by the institution for its normal constituency, then practitioners and patients may move to other institutions and not return following the completion of a renovation project.

The cost-based reimbursement formulas used by Medicare, Medicaid and Blue Cross for hospitals do not favor either renovation or new construction (based upon the direct cost flowing from a major project). If the capital costs are equivalent for a renovation project and a new construction project, there is virtually no cost-based reimbursement effect because in both cases reimbursement would cover depreciation and interest on outstanding debt. Renovation may be of some advantage to an institution if the renovated facility has a shorter life than a new facility because the revenues flowing from depreciation may be accelerated. There may be other considerations ancillary to the project that affect the reimbursement formulas such as limitations disallowing depreciation or interest expense, or limitations on total cost. There also may be specific planning or regulatory criteria with regard to the mix of debt and equity.

Outside the hospital environment, there are market considerations which impact upon the feasibility of renovation. The markets for ambulatory care and nursing care facilities tend to be more price competitive than hospitals. For ambulatory care and nursing facilities, the cost of carrying and operating the plant represent a higher percentage of the operating costs than it does for a hospital. In the competitive market place, the ability to lease space to physicians at a relatively low cost is desirable. The practicing physician wants as low an overhead as possible in order to make money and, therefore, will seek office space which is most reasonable. A somewhat different situation occurs when a hospital renovates a building into attractive office space and rents it to physicians below cost. The motive is to draw new physicians to the facility and increase patient revenue to offset the rental loss.

In the nursing home setting, debt service represents 20 to 25 percent of the total operating costs. Housekeeping and utilities account for as much as 25 percent. The point is this: controlling the costs associated with the building and its operation is much more important to the successful operation of a nursing home than it is to a hospital. This problem is made more critical by the limitations placed on reimbursement for nursing care. For a nursing home, the financial feasibility of renovation versus new construction becomes a most critical issue because of the competitiveness of the markets.

To put the financial feasibility issue for hospitals into its proper perspective, that portion of the operating costs resulting from capital expenditures (debt service) must be compared to the total operating costs for the institution. An examination of recent bond issues offered by four Philadelphia hospitals showed that the ratio of annual debt service to operating expenses ranged from just under 4 percent to just over 12 percent.[5] The highest ratio was for a project in which the equity portion of the total financing package was less than 5 percent. The projects largely represented new construction for hospitals well established in the Philadelphia community. In each case, some small portion of the project did relate to renovation of facilities.

What appears to be significant, in the financial feasibility of these projects, are non-capital expenses. It follows, then, that life cycle costs for the facility, which include not only the costs of operating the plant, but the operational costs related to the activity existing with the facility become paramount in the determination of financial feasibility. Unfortunately, there is almost no data in the field about life cycle costs of hospitals or other health facilities.

While renovation projects may not save financing costs, a major factor may be the use of existing structures to obtain financing. The existing structures which are to be renovated have equity and can be used as leverage for securing financing. There is a very great need and desirability of equity in a project to reduce the risk to lenders and to improve the marketability and cost of financing. It further reduces the burden on an institution to find new capital for land purchases or to support the costs of construction.

There are a number of alternative forms of financing available. These include tax exempt revenue bonds, a Hill-Burton loan guarantee and subsidy, Federal Housing Administration (FHA), insured mortgage loans (with Government National Mortgage Association (GMNA) guarantee), a conventional mortgage or taxable bonds. (For a complete comparison, see chart Appendix II). The variety of ways in which the financing may be secured, either publicly or privately or combinations, are often a function of the imagination of an investment banker or mortgage broker.

Topics for future research

The decision to renovate existing facilities as opposed to building new, appears to be governed in part by the relative size of the project vis-a-vis the total institution. Substantial renovation projects may be undertaken in existing institutions because there is no additional land and/or the cost to rebuild the entire institution is so large that it appears renovation is a more prudent investment. The question of "How large must a project be before a total replacement is considered?" should be investigated. This should be considered against the background of both urban and rural settings, and a variety of land use and land availability situations.

The data on life cycle cost is very limited. A study of such costs would consider not only the traditional concerns of plan, construction and operation, but also the more difficult and less easily measured cost of total operation within a facility. Questions then of function, alternative systems, and future reuse become important. A 1972 study by the federal government suggested, for instance, that single bedroom hospitals are less expensive to operate than multiple bedroom hospitals.[6] This is an example of the kind of study that should be done and the kind of study that must be confirmed by other research.

A threshold question is whether or not there is a difference in terms of financial feasibility between renovation of facilities and construction of new facilities. Many professionals in the field, who are experts in financing, believe that there is little difference from a financial feasibility standpoint between renovation and new construction as it relates to hospitals.

Closing

Despite the limited data available on the subject, several key differences between the feasibility of renovation versus new construction have been discussed. The largest potential savings exists in preserving the existing structural, mechanical and electrical systems. However, these savings may be offset by higher engineering, architectural, broker and accounting fees. A second major savings lies in using the existing site saving land acquisition, demolition and site preparation costs. These savings may be offset by lost opportunity costs because of the disruption of an existing operation, or length of time required for a renovation project. Finally, cost reimbursement in hospitals does not favor either new construction or renovation. However, the cost of a construction project in ambulatory and nursing care settings becomes critical due to the price competition in these markets.

Future research on this subject should consider the circumstances under which renovation projects might be undertaken as they relate to the size of the project, the size of the institution, and the nature of reimbursement. Additional study is needed on the life cycle costs of operating health facilities to determine how the cost of construction and renovation effects them. Such research would help clarify the inherently held opinions of many professionals in the field as to the wisdom of renovation or new construction under a variety of circumstances.

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Reaction to financial feasibility presentation

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Mark Levitan has been talking about the "reuse" of existing health facilities and since I had a chance to read his paper in advance of our session here, I can say comfortably that I think he has done pretty well in covering the factors one should consider in judging the financial feasibility of health facility reuse.

He emphasized the value of the land upon which the facility sits as an important factor. This is particularly true in crowded urban areas. Accumulating land sufficient to add new structures to an existing facility is often very expensive and time consuming.

He claims the largest savings will come from lower construction costs and uses a report from Turner Construction Company to document this claim.

On the other hand, he cites the problems of disruption of operations, loss of revenue during renovation and even the loss of a constituency—i.e., doctors and patients who may never return—as major problems inherent in a reuse program.

Now that I've established that I can read and repeat parts of Mark's paper, I can go on to tell you of my personal experience that got me to this conference in the first place.

I am the president of a 532-bed acute care hospital built into a bowling pin factory. I don't know if I've been Reused, Retrofitted or Reconfigurated but at $67,000,000 I have a feeling ours is the granddaddy of all successful efforts to recycle an existing structure. The building I'm talking about was built as, and used as, a factory to manufacture bowling equipment by the American Machine and Foundry Company. When the company moved out of New York City in the late 1960's, they left this massive five story structure to the City as a tax write-off. After a very complicated political process, the City of New York gave the 500,000 square foot factory and four acres of land to the Lutheran Medical Center (LMC) in November, 1974, and we began construction immediately. In July, 1977, 32 months later, the staff and patients of LMC moved in and began using a marvelous physical plant for patient care.

The decision to proceed with this dramatic recycling of the building followed studies by Rogers, Butler and Burgun, our Architects, and Turner Construction Company, our Construction Manager. These studies determined first that an effective hospital operation could take place in the recycled building and secondly that construction would be cheaper if done within the existing shell, than it would if we started from the ground up.

To determine whether efficient medical care could take place within the existing shell, we and our architects agreed that the shape, size and number of floors in the building were such that 532 beds, an ambulatory care center and other necessary services could find adequate space and be arranged in a sensible fashion.

Determining whether we would save money by using the existing shell was more complicated and was the deciding factor as to whether or not we proceeded with the project. Let me quote now from the feasibility report done by our architects:

"1. The AMF building is structurally sound and has been well maintained. Floor to floor heights are ample. Floor loading is adequate for hospital occupancy. All existing mechanical and electrical systems will have to be replaced with the exception of part of the sprinkler system.
2. The fixed elements on the interior of the building such as stairs and columns do not greatly inhibit the range of planning possible.
3. Operating costs for a hospital in the AMF building should not be greater than for an all new building.
4. The building can be built for approximately $5,750,000 less in construction costs than a new building designed for the same program."

And then the report said in summary:

"We conclude that the constraints inherent in designing services to fit an existing shell have not been so severe as to prevent the evolution of a good workable plan. The extra cost incurred in overcoming some of the disadvantages are more than offset by the savings possible by avoiding the cost of the land and the construction of the basic structural shell."

The Turner Construction Company in its study of the problem used a different approach to estimating cost savings. They estimated the value of the factory shell given us by the City as follows:

Methods of financing capital improvements—a cost comparison chart

Program Characteristics	1. Tax-exempt revenue bonds	2. Hill-Burton loan guarantee with interest subsidy	3. FHA insured mortgage loans (with GNMA guarantee)	4. Private placement of conventional mortgage or taxable bonds	5. Public taxable bonds
Approximate time required (months)	6–10	5–8	7–12	2–6	6–9
Percentage financing available	Up to 100%	Up to 90%	Up to 90% or $50 million	Usually less than 60%	Usually less than 70%
Eligible project costs	Covers all costs	Does not include shelled-in space; demand feasibility study; all fees and costs associated with financing, i.e., interest during construction, placement fee, legal and title insurance fees	Does not include shelled-in space, demand feasibility study	Covers all costs	Covers all costs
Loan term (years)	Up to 40	Up to 25 including construction	Up to 25 after completion of construction	15–25	15–25
Interest rate	1½–2% less than non tax-exempt issues	Not to exceed FNMA average auction yield rate on four-month contracts (lowest not cost of any financing method)	Prevailing FHA coupon rate plus .5% annual mortgage insurance premium on outstanding balance	Market—as defined by supply and demand for funds in private capital market	Market—as defined by supply and demand for funds in public capital market
Front-end fees	Underwriting spread usually 2–3% feasibility study $0,000–$75,000; legal and printing expenses $100,000–$150 000	Financing fee .1%; legal fees $5,000–$20,000; points if necessary to adjust yield to current market conditions	Financing fee 1–2%; legal fees $5,000–$35,000; filing and inspection fees .8%; points if necessary to adjust yield to current market condition	Financing fee 1–2%; legal fees $5,000–$25,000; possible commitment fee of 1% to institutional lender	Underwriting spread 2–4%; feasibility study usually necessary, $40,000–$75,000; legal and printing, approximately 1%
Prepayment provisions	Restrictive, usually none for 10 years. A declining penalty thereafter	15% of the original principal, amount in any year with no penalty. In excess of this amount at a premium usually 103% declining 1/8% per year.	15% of the original principal amount in any year with no penalty. In excess of this amount at a premium usually 103% declining 1/8% per year	Restrictive, usually none for 10 years. A declining penalty thereafter	Liberal, traditionally non-callable for two years; non-callable for refinancing five years

"Eastdil Health Care Funding, Inc." 1974 *Financial Management of Health Care Facilities*, edited by William O. Cleverly, Ph.D., Aspen Systems Corporation, Germantown, Maryland 1976 p. 274

Excavation and foundation concrete valued at	$1,650,000
Structural frame	4,000,000
Exterior wall	775,000
Interior finishes	100,000
General conditions and contractor's fee	575,000
Total	$7,100,000
Less—cost to prepare existing shell for reuse	—1,850,000
Net value of existing shell	$5,250,000

It was interesting to see that our architects estimated savings in construction as approximately $5,750,000 and our contractor estimated the value of the existing shell at $5,250,000.

We felt rather sure that proceeding with the construction of our hospital in the old bowling pin factory would save at least $5,000,000 in construction costs.

And then there was the time factor—the prediction that later came true that construction time might be cut by as much as 12 months as compared to starting from the ground up. For each month that we could reduce construction time we would save $250,000 of interest on money borrowed during the construction period.

Remember that we constructed this project in 32 months. If we assumed that a hospital of this size and complexity might ordinarily take more than 3½ years to complete, the 12 months saved in construction time saved us $3,000,000 in interest expense.

When these savings are added to $5,000,000 in construction costs, we get a projected savings of $8,000,000.

So, with a report that said recycling of the factory into a hospital was architecturally and operationally feasible, and with substantial dollar savings projected, we proceeded with, as far as we know, the biggest reused, retrofitted, reconfigurated, bowling pin factory in history.

Turner Construction estimates for medical/surgical general hospital in a non-urban setting

Subcontracts	*Estimated Construction Cost*			
	Renovation		*New Construction*	
	Cost/foot	*% of Total cost*	*Cost/foot*	*% of Total cost*
Foundations	—	—	2.00	2.2
Structural frame	0–1.50	0–1.9	6.00–9.00	6.7–10
Roof	—	—	1.50	1.7
Exterior walls	1.00	1.3	3.75–5.00	4.2–5.6
Interiors	13.00	16.8	12.50	14.0
Elevators	1.50–2.50	1.9–3.2	1.50–2.50	1.7–2.8
Plumbing	3.00–5.00	3.9–6.5	6.00	6.7
FB	.50	0.7	.50	0.6
HVAC	12.00–18.00	15.5–23.2	14.00	15.6
Electrical	10.00	12.9	12.50	14.0
Special requirements (ie, medical gases)	6.00	7.5	6.00	6.7
Demolition, cut & join temporary partitions	1.00–3.00	1.3–3.9	—	—
Site work	—	—	5.35	6.0
General condition	5.00	6.5	5.00	5.6
Subtotal	59.25	76.5	76.60	85.5
Contractor's fee	4.75	6.1	3.40	3.8
Construction total	64.00	82.6	80.00	89.3
Architectural & engineering fee	7.04	9.1	6.4	7.1
Contingency fee	6.40	8.3	2.40–4.00	3.6
Project total	77.44	100.	89.60	100.

In conversation with the Philadelphia office of Turner Construction Company, March, 1978

Financial feasibility panel summary and recommendations

Frederick B. Putney, Ph.D., Deputy Vice President,
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Financial feasibility tends to serve as a constraint on everyone's behavior and therefore its appropriate that we are the first presentation. In the context of the current natio. al and local debate on cost containment, I must say, we had a hard time keeping our discussion and concerns away from the macro issues related to cost containment. One of the things that became apparent is that we are facing a whole new set of new managerial perspectives. Concepts like matrix organization, budgeting or resource allocations and alternative decision-making are coming both from the public and private sectors. These things kept popping up in our discussions (and I'll return to them as we go along), because the fact is that we're going through a huge managerial evolution.

We started with a marvelous presentation by Mark Levitan from the University of Pennsylvania reflecting both his experiences in the profit sector of health care and now in the non-profit world of health care. The question that Mark posed in his presentation was that, assuming that non-financial factors are equal, is there a difference in project costs between new construction and renovation? Starting from the assumption that the scope of work to be done, the programs and functions to be housed in the facilities are approximately equivalent, is it less expensive for an organization to reuse old facilities or to construct new ones?

Those of us who have been dealing on the institutional side often call reuse, retrofit and recycling just plain "renovations." That may be a bad word, but we'll renovate anything.

The answer to the above question was a conditional *yes*. That bothered a lot of people but the conditional *yes* was that indeed there are potential construction or project cost savings by choosing renovation over new construction. The key potential savings came from the land cost, assuming that we do not have to deal with additional land when we renovate or reuse an existing facility, and also from the foundations, the structural frame, and possibly the roof, exterior walls, plumbing, electrical and other kinds of services which may be a permanent part of the building.

There are other factors in the renovation versus new construction question that represent potential cost increases. Some of those include the uncertainties involved in a renovation project. The contingency factors, according to the data that Mark Levitan used in his paper and as many of us have found from experience, can be a major project cost. These are real expenditures but they can't be budgeted to a specific building trade. Reuse project contingencies run almost twice those used in new construction projects. Additionally, because of the nature of the work process, since the architects and the engineers and consultants involved in the design preparation are dealing with uncertainties, there may be more design time necessary, and architects' and engineers' fees may be higher than for new construction. If you are doing repetitive layers of work, however, you will learn along the way and eventually be able to reduce the fees. There are also alternative billing procedures that will allow a time card and upset limit fee. There are a number of methods of contracting that will contain some of the costs, and in general, we concluded that when working with an existing structure one can reasonably expect to save 10 to 20 percent in a reuse project over a new construction project.

That does not include some other implicit costs. We may have opportunity costs to be considered. There may be substitute facility costs. For example, how do you continue to deliver health care during construction? Does it take more time to renovate than build new? Time is a cost factor and the money that is being used can be invested, or if borrowed such funds have a price per unit of time. The determination to reuse versus building new is circumstantial to each individual project. However, one must consider not only construction costs and general conditions, but also interim operating cost differentials associated with each specific problem.

Another issue that was discussed during the open debate was life-cycle costs. What are the life-cycle costs of a facility? This issue is related to the revenue function that the organization faces. That is, with the cost reimbursement market structure it does not make any difference whether you spend $50 million or $80 million on a project. If it is true cost reimbursement, whatever the costs are, they are reimbursable. However, there are three types of markets. One is true cost reimbursement. Those of us who are going through the saga of New York State have fixed fee reimbursement. This is also common for nursing homes. In this kind of market the

dollar amount of the project and its ultimate operating costs may make a difference in the financial feasibility of a project. The third kind of market is the pure-price market where you have various kinds of facilities, institutional facilities and doctors' offices where the market price is established by competition among alternatives in the market place. In these situations the cost differential between reuse and new projects may be very important.

This led us to the question of whether financial feasibility really is a series of techniques or whether it is a surrogate for more fundamental economic analysis. We came to the conclusion that we were really talking about economic feasibility. The financial feasibility tools—the market studies, the cost analysis, the operations analysis, and the social benefits of the project—were really technical analyses to support an economic and political decision.

George Adams presented the case that feasibility is a political decision, and gave us a case example of the Lutheran Medical Center, which built a 532-bed hospital in an old factory building in Brooklyn. The total project cost was $67 million. In the process, he expanded what was an old, somewhat financially bereft organization with 300 beds into 532 beds. He now has a completely new facility, most of which was financed by Article 28B low-interest revenue bonds. This is an extraordinary example of what was really a social movement. It provided us an excellent case example and definition of *recycling*. For the urban planner this was an urban community recycling project that salvaged an abandoned factory (which was a social blight) and created a new viable hospital-medical facility. He walked us through his political and decision-making process over a seven-year period, starting in 1970 and ending with the completion of the project in July of 1977. This was an extraordinary project from a construction management, project sponsorship, institutional decision-making, and a neighborhood development point of view.

The planners of this project passed through a series of justification processes to get them through what we would call benchmarks or gates. Many of those gates required an economic or financial argument. In that gatekeeping process one of the tools used was an analytical process dealing with the cost differential between building a totally new facility versus using the shell and land of this factory. New construction for a similar scope project would have been $98 per square foot at that time, and they estimated the retrofit construction cost to be $80 per square foot. As it turned out, their costs came in at about $80 per square foot, and the cost of equipment, furnishings and financing costs brought the total project cost to $67 million. They illustrated how to use equity as a funding strategy allowing them leveraging to rebuild or reconstruct the whole facility starting with no funding.

One additional interesting point was that the debt servicing cost for this facility turned out to be 10 percent of their operating budget. The operating budget is 50 million, 5 million of which is debt service (interest and principal). This figure coincides with the rule of thumb that Mark Levitan provided from his research. In addition, we were provided an interesting and rich example of a totally recycled facility. One of the things that George Adams pointed out is that in the process they made an overt decision to try to capitalize as much as possible. They installed many automated functions which have the potential of providing some labor substitutions and in the long run provide for reduced operating costs. It would be interesting to follow up on that decision with in-depth case method research to document the actual impact on operating costs.

Now as a synthesis of our discussion, we have five kinds of issues. First, we are really talking about economic feasibility, not financial feasibility. The financial feasibility tools and techniques of the business world are helpful, but all they do is elucidate a series of political and social assumptions that we call economic analysis. Secondly, the hospital or nursing home or long-term care facility must be recognized as an infrastructural institution. It is a mainstay in the neighborhood, and plays a strong role in the vitality of the neighborhood as a major employment and services base. So the economic analysis for re-use projects should be put in the context of the social benefits and economic benefits to the total community.

Third, the market analysis activity of social or financial feasibility is a very thorough process and it is based on a series of overt assumptions which perhaps need to be challenged. Are you going to continue with the health programs that we have today? Are the regulatory agencies going to indeed have the power to change our health care delivery systems? Are there alternative institutional arrangements, aggregations or combinations of several institutions which may shape and change the present marketplace? One can then look at the very real question of salvaging an old facility within the context of an infrastructural institution.

Financial Feasibility is a numbers game based on economic asumptions and political decisions. One particular caution is that the revenue functions in a reimbursement-based market are very sensitive to change. A capital investment with a forty-year life (or a forty-year bond issue) requires assumptions about the revenue function and the risk associated with the repayment of that debt. Michigan, Massachusetts, and some other states, have a large amount of debt outstanding for facilities and older institutions which are now defined as underutilized due to regional overbedding. How does the institution adapt when there are restrictive clauses in the financing which prevent the organizations from turning those facilities into alternative uses, or disposing of them?

The following are the key research issues developed by the Financial Feasibility Panel.

1. There are inadequate criteria for evaluating certain kinds of capital projects. An example would be a project to upgrade a facility to comply with current building codes. How does one test for financial feasi-

bility when you are talking about code compliance projects? If you have a regulator that says you must put in a sprinkler system, and that's a million dollar project which needs to be financed, how does one evaluate the project's feasibility?

2. Analytical tools or evaluation methods for many of the not very dramatic types of renovation construction are needed.
3. Case method research should be done on the financial feasibility criteria for evaluating the viability of a reuse project versus new construction. One has to break down the cost layers on all pieces of the projects, not only the construction and architectural costs, but all costs—full operating and life-cycle costs.
4. What are the constraints caused by the various financing and approval methods that are being used? Institutions can be restrained from reusing facilities which have been financed by certain authorities.
5. The financial feasibility and certificate of need process is a gatekeeping function which is predicated on the assumption that there is a need to control individual institution's access to the market place for capital financing. It is based on the premise that society wants to ration resources to the health care delivery system. The question is, are resources really scarce and do the financial markets want to see them rationed? It's a good question that would require some financial market research.
6. How can one differentiate financial feasibility for *one* capital project from the feasibility for a *series* of capital projects? How do you differentiate financial feasibility, economic feasibility, or both from the overall cost-containment issue? One fear that many institutions have is they will get beaten on the head for bringing up a project which is seriously needed. How can you differentiate the evaluation of specific projects from overall health services financing issues?
7. Are there differences in capital and operating costs for a reused facility as opposed to a new facility? Is there a marginal benefit for new construction because of the new technology in building structure and systems design? Can that potential savings in operating cost be compared to savings in reuse construction costs?

Finally, there is an important area that we did not discuss but should be mentioned. Can health facilities be effectively used for other purposes, such as office buildings, stores, residences, educational facilities? Is there a reuse market for excess hospitals? For example, there is a hospital up at 165th Street and Riverside Drive which the City of New York closed. It is the one successfully closed hospital by the Health and Hospital Corporation of New York City. It has a wonderful boiler, and mechanical system, yet it is just sitting there. What is the reusability of that facility? How can reusability be determined?

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Critical issue panel on codes and standards

1. Position Paper by Louis Reuter IV, A.I.A.
2. Reactions by J. Armand Burgun, A.I.A.
   by Joseph G. Sprague
3. Summary and Recommendations by Grady Smith

Presentation to codes and standards panel

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It would be unfair of me to give this presentation without confessing a few prejudices and shortcomings right at the start.

To begin, I am not a scholar of construction codes and standards in health facilities as are several of the other panel members—Mr. Burgun and Mr. Smith, in particular.

Second, I find that the establishment of a conference on health facilities reuse/retrofit and reconfiguration implies that the carrying out of such activities may be desirable. One of the charges I was given by Mr. Parker was the discussion of how increasingly complicated and continuingly more stringent codes place severe burdens upon the reuse or retrofit of existing buildings; and from wording, I interpreted that one of the missions of this conference would be to seek creative solutions that would allow the retrofitting of existing structures. That is a goal that I am not sure I am willing to work towards. My hesitancy is grounded in one piece of legislation, namely Public Law 93–641, the National Health Planning and Resource Act of 1974. For a law that deals with health facility bricks and mortar only in some of its more esoteric passages, I am firmly convinced that this law will have a much more significant impact on health facility buildings than say Health Resources Administration (HRA) 76–4000 or the new 1976 National Fire Protectional Association (NFPA) code.

With these confessions out of the way, I can proceed to the main body of my presentation and you can now have the benefit of making the appropriate interpretation of my bias.

We can safely begin with the premise that construction standards for health facilities will continue to be more stringent; they will become more profuse and they will continue to expand into more and more building systems and once there they will become increasingly specific. Furthermore, more and more people and/or agencies will have the opportunity to pass on construction standards. The eternal plea for some sort of consistency continues to go unanswered; the ever growing lists of standards continues and with it, the increasing complexity and contradiction of applicable codes become practically undecipherable. Several years ago, in a publication by the National Academy of Sciences, Mr. Burgun succinctly outlined the consequences of the code growth phenomena.

1. Discourage needed modernization.
2. Increase the time necessary to complete a project.
3. Reduce the quality of architecture and engineering design.
4. Increase the cost of hospital expansion and improvement.
5. Reduce the efficiency of hospital operations.
6. Postpone advances in medical services
7. Discourage long-range institutional planning.

In a single statement, codes place severe burdens on the Reuse/Retrofit and Reconfiguration of health care facilities.

Construction codes and standards have another effect that I have not heard discussed before, and it is the fact that codes operate as essential determinants of facility obsolescence and the financial consequences can be severe, aside from the cost of correction.

Let me give you two examples.

I was recently involved with a large multi-use hospital in New Jersey. The hospital had a mix of acute hospital, skilled nursing and intermediate care beds. Each of these types of beds was, of course, housed in different types of physical space, each governed by separate construction standards. The intermediate care beds were in a fifteen year old structure. Corridors were 7′–0″ wide and the building had a wooden roof structure. The building had been financed by the issuance of public notes on a 25-year term; depreciation charges returned by third-party payers were used to pay the bond holders. Nine years into the bond term, the State closed the top floor citing the combustible roof construction. Three years later, the State served notice that the corridor widths were not acceptable and the remaining patients would have to go.

The hospital was left with a serious financial problem. It had 13 years left to pay on a property that was no longer income producing. To make matters worse, depreciation had been collected for only 12 years, while the Internal Revenue Service (IRS) schedules clearly state that a building's life is 40 years and its mechanical equipment life is 20 years. The hospital's balance sheet was radically changed in one day, the per diem on a smaller

patient base would have to be raised significantly. Sixty nursing home patients had to relocate in an area already estimated to have a 500-bed shortage in inter-term nursing facilities and the hospital board was stuck with an empty white elephant, that, except for the wooden roof, would be costly to even demolish.

I don't want to comment at this time on the appropriateness of the State action in terms of the patients welfare or safety, but rather, wish to illustrate a general financial principle. The main point is that codes as yardsticks of obsolescence can have disastrous financial consequences aside from construction costs. Perhap the IRS should alter its regulations for computing, depreciating to a 40-year depreciable building life *OR* until the next retroactive building code change, whichever come *first*.

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My second example illustrates the same point but adds the absurdity of "by the book" applications of code enforcement. I am currently working with a group of three 100-bed hospitals in Pennsylvania. They are well on their way towards merging and building a totally new, central, consolidated facility while simultaneously closing the three present facilities as acute care hospitals. The new structures will be completed in just over 36 months. One of the many reasons for their merger was the age of the existing buildings; in varying degrees some had extant code violations. One hospital, for example, exceeded the 1967 Hill-Burton code requirement for distances between fire stairs on patient units. (Pennsylvania still uses the '67 code, while selectively enforcing parts of the 1969 code.) Along comes Labor and Industry in 1976 and informs the hospital that it will have to construct two exterior stair towers to overcome the violation or the hospital may lose its operating certificate. The potential results are almost silly; a hospital that will close in three years is being forced to undertake a significant capital expenditure which can only be financed through funded reserves of the hospital. These, of course, are the same funds that are to be used as a portion of the equity for the new project which is partly a solution to changing codes.

The two illustrations point to the dilemma that results between buildings that have useful lives of 20, 40 even 50 years, and construction codes or standards that change much more rapidly. Retroactive application is the main issue with respect to reuse/retrofit and reconfiguration. If buildings were allowed to operate under those standards that applied when they were designed—the necessity of this conference would vanish.

Since one of the aims of this conference is to seek constructive approaches to building recycling, the fairness of retroactive building code application must bear detailed examination. We have to start with the basic concepts that cause codes to be continually altered and updated.

It is generally agreed that the underlying reason for a building code is a concern for the occupant's safety. More specifically, codes, for the most part have their genesis in protecting the occupant from fire. While many predecessors can be found in the laws of London, Amsterdam and most notably, New York City's 1901 Tenement House code, the modern building code was not born until the mid-1940's when, after a series of tragic hotel fires, the necessity for legislated minimum building standards became apparent. Shortly thereafter, it was clear that fire protection was no simple matter, and like all newborn scientific endeavors, the early theorums and accepted facts were continually challenged by additional scientific testing. The body of known fire protection knowledge was, and is, being ever expanded through experience; and it is only natural that both technology and the codes must be updated to keep up.

At first, even a single event could cause a major shift in emphasis. The Hartford Hospital fire of 1961 almost single handedly caused a total rewrite of hospital construction standards, beginning the long train of standards with respect to fire stops and combustile materials control. The importance of the latter cannot be under valued since it is now a well-known fact that more than half of fire related deaths are not due to external burns, but rather the results of inhalation of combustion by-products.

As architects, and as other professionals, concerned for the life and safety of all people, I doubt that any of us would seriously argue that older buildings, particularly hospitals, should be exempted from retroactive application of newly developed construction standards where those standards have clearly demonstrated a life-saving or preserving ability. In fact, I think we have an obligation to lead in those areas and it would be my recommendation that any statement this conference might develop with respect to code enforcement should begin: *In no circumstance should a reused, retrofitted or reconfigured hospital building fail to include the latest code provision with respect to fire safety.*

This may be far easier to say than to do, because we must also take cognizance of the fact that fire protection standards exist for many reasons beyond occupant safety. For example, the main reasons for fire proofing steel structures for 2, 3 or 4 hours has little to do with occupant safety. In a raging inferno, no occupant would survive beyond an hour or two. The code exists to maintain the structural integrity of the building for the protection of the fireman. Likewise, many fire code provisions have been developed to protect adjacent buildings and, in turn, their occupants. But each of these examples continues to save human life, and any code provision that could be clearly identified as a demonstrated life saving measure would fall under my recommended standard.

In the same vein, hospitals should not be exempted from retroactive life saving code provisions in areas other than fire hazard. I can think of protection from electrical shock, explosions or radiation hazards. Quite simply, all buildings, new and old, health facility or not, cannot be granted variances for known life safety assemblies.

The difficulty is what is a *known* or a *proven* life saving assembly. Consider the length of an exitway

access. Most codes make reference to a specific maximum distance from a remote point to an exitway door. The Building Officials Conference of America (BOCA), when referring to hospitals, calls for a maximum of 75 feet. Now, what of a hospital 20 or 25 years old that has 100 feet of exitway access. Can it be conclusively demonstrated, either by actual numbers or by probabilities that the extra 25 feet is, in fact, a killer. And if it can, what of 15 or 10 feet. My point is that there may be clear life saving provisions and there are those that may be more dubious. Where clarity exists, all health facilities should be forced to comply; where it does not, perhaps a double standard should be allowed. This issue of retroactively applying minimum codes should receive considerable attention in future research.

The next area that needs dissection is the determination of what part of the code exists to minimize insurance losses. Phillip Berggreen, of the Aetna Life and Casualty Company, speaking at a 1971 conference on Life Safety in Health Facilities sponsored the New York City Chapter of The American Institute of Architects, made the following tough statement:

> "Health care costs are rising at a rate almost double the cost of living. Insurance costs are part of this increase. Insurers cannot continue to provide coverage where the exposure due to technological advances are not eliminated or controlled by proper design."

The cost of insurance must, at some point in the life of a building, come under a detailed cost benefit analysis. It is not unlike my car insurance. When I first buy it I seek full collision coverage; then, in about a year or two I go to $100 deductible, then a little later to $200 deductible, and then somewhere, around 80,000 miles, I give up collision all together and take my chances, safe in the knowledge that even if the car were totaled the insurance pay-out would be trivial compared to the cost of a new car.

Perhaps the same principles should apply to some of our older hospitals. If we start with the premise that all due caution has been taken with respect to patient and occupant safety, with fireman safety and with the protection of adjacent property and persons, is there any reason to construct the old buggy any better solely for the purpose of minimizing fire spread. I realize this statement may seem flip, but it may merit some thought. I am reminded of the fact that our structural engineering codes for buildings often contain safety factors of 4–10, whereas the safety factor in the structural engineering of a 747 is next to nothing. The reason, of course, is that the cost of safety factors in the plane, both in terms of dead weight and materials prices would never let Boeing off the ground.

The final type of code provision I want to discuss leaves the area of life safety and deals with occupant welfare or comfort. Construction standards and codes of recent vintage have begun to deal more and more with building amenities. HRA 76-4000 and American National Standards Institute (ANSI) A#117.1 are two prime examples. The effect that these standards have on existing facilities is tremendous and in some respects these types of codes spell far more trouble for reconfiguring existing plants than do true life, safety and fire changes. It may be tedious piecework, but basic upgrading of firestops, smoke doors, corridor walls, fire alarms and detectors and sprinkler systems can generally be accommodated in older hospital structures. Such is not the case with the amenity codes. These require radical adjustments in building configuration, design and organization. In many cases compliance is impossible, and the latest codes can instantly make hundreds of functioning hospitals obsolete.

Perhaps the most dramatic single amenity change to effect hospitals was not a construction standard, but was the 1972 Medicaid ruling that permitted Medicaid patients to enjoy the comfort of, at least, a four-bedded room. While the humanity of the ruling is not at issue here, that ruling instantly brought the ward system to termination and left many a facility obsolete beds.

The amenity changes, to be difficult, need not be so dramatic. Consider one simple provision of HRA 76–4000 that if made retroactive would present serious difficulties to every hospital in the country. Section 7.9C2 promulgates this program standard:

> "General purpose examination room(s) . . . shall have a minimum floor area of 80 square feet (7.43 square meters), *excluding* such spaces as vestibule, toilet, closet and work counter (whether fixed or moveable.)"

In my recent experience the net result is at least a 10 percent increase in room area. The old standby program standard of 80 square foot exam room is out the window, replaced by the 88 or 90 square foot exam room, unless of course it is on the nursing unit where it becomes the 120 square foot unit plus the necessary exclusions. If this one new provision alone were made to apply to existing institutions, there would be very few operational hospital outpatient departments, even of recent vintage, that could meet the standard.

The above change is minor in its verbage and its outcome, but it is a major change to an existing building. Amenity changes can be quite simple. One easy one is the growing standard (not yet encoded to my knowledge) for clocks in the Coronary Care Unit (CCU) Original CCUs had no clocks, then it became common practice to make each patient have unobstructed view of a clock, today cardiologists recommend that the clock also show the day and date.

The nursing unit has seen simple standards cause maximum disruption. A minor change such as "each patient shall have access to a toilet room without entering a general corridor," struck a blow for patient dignity and privacy at the same time it took every pre 1976 hospital into oblivion. Likewise, Section 7.2B requires that each nursing station be backed up by 18 separately identifiable spaces:

1. nurses station
2. nurses office

3. office supply storage
4. handwashing facilities
5. charting area
6. staff lounges and toilets
7. staff closets or lockers
8. multipurpose room
9. exam room
10. clean work
11. soiled work
12. drug distribution center
13. clean linen
14. nourishment station
15. equipment storage room
16. stretcher and wheelchair parking.

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If you have been through even a few 8 to 10 year old hospitals you know that they not only do not have half of those spaces but you also know that they have no space to add them. The recent evolution of barrier-free standards is already creating code violations at entranceways, in corridors, toilet rooms, and in places from elevator push buttons to panic hardware and drinking fountains. A new and more stringent ANSI standard has just been released.

The amenity changes have not stopped at mere physical elements of the building but are well advanced in the acoustic, visual and thermal atmospheres as well.

The results of these amenity changes are admirable and not in question. Patient dignity and privacy have been improved; hospital operations have been improved; an entire group of persons, the handicapped, ironically long ignored by hospital architecture and reimbursement are being invited back into our hospitals as workers, patients and visitors, and if you find it easier to park near future hospitals, well, you can thank HRA 76–4000 Section 7.1E for that.

I want to pause briefly at this point and recap several key points:

1. construction codes and standards will in all likelihood continue to be complex and even contradictory;
2. emergency technology coupled with real life experience necessitates a continual renovation of building codes;
3. building codes and standards, correctly or incorrectly, logically or not, are the most obvious and important measure of facility obsolescense;
4. codes and standards seem to change in three generic areas.
    1. life-safety or life protection,
    2. asset safety or facility protection,
    3. patient and/or operational amenities.

With these four tenants in place we can almost move directly to a discussion of how codes and standards do and should interfere with health facility reuse, retrofit or reconfiguration. I say almost, because, as I stated in my introduction, I feel there must be a need or a reason for wanting to do that.

The most obvious reason to expect is that some of us perceive a need for something—a program, a service, a person or an organization—to require physical housing. We need not assume, for starters, that what needs housing is only a health related thing. We could just as easily start with the idea that the poor need better housing, our children need more neighborhood schools, the Social Security Administration needs more office space, Seventh Avenue needs more sweat shop space in non-unionized communities or Mr. Parker and I need more indoor tennis courts. In considering these ideas, I quickly came to the conclusion that probably none of the above were viable options. I know of one or two attempts to design housing units into closed hospital facilities and in a nutshell, the spans fenestration and building organization and types of space do not easily adapt to apartment or housing situations. We may need more schools, but the country already seems to be developing a vast reservoir of discarded schools that nobody can figure out reuse for. As for social security, well with General Services Administration's (GSA) recent announcement of its "Living Buildings" program, a euphomism for what to do with 10,000 underused federal buildings, I think GSA will do fine. Seventh Avenue gave up trying to find non-unionized communities in favor of non-unionized countries. And finally, long span light-weight metal buildings simply aced the tennis thought.

This is not to say that occasional creative non-medical use for discarded hospitals will be developed from time to time. Where this does happen, however, it will happen in the face of hard economics and I doubt that codes and standards, other than zoning, will present significant barriers to reuse. That leaves us with medical uses and those could conceivably occur in two directions. Reuse as on-going hospitals, or retrofit or renovation to a health activity other than acute hospital service.

With respect to the first, namely reuse as hospitals I have two specific difficulties. The presumption is that (a) we need more or at least the same number of hospital beds in the country that we now have and (b) that there is some economical reason for reusing rather than rebuilding.

Presumption (a) flies in the face of reason. There is no logical way to refute the overwhelming evidence that this country has an excess of non-federal acute hospital beds. Pick your own piper if you will, from the National Academy of Sciences to Ralph Nadar's Health Research Group, but you cannot argue the point. Responsible estimates may vary from an excess of 60,000 to 110,000 beds, but make no doubt about the actuality. In reality, the argument is not worth the energy, the point is a moot one since DHEW has already issued its planning guidelines which demand a 10 percent reduction. I have been through a few crunching review processes under P.L. 93–641 and the new guidelines and I can tell you there are an awful lot of providers, indirect providers and consumers out there who aren't about to allow a single new bed.

The next problem with presumption (a) is that in addition to an excess of beds, up to 24 percent of all

operating hospital beds are reported to be in substandard or non-complying structures. It would seem logical that these facilities would be the first to benefit from a concentrated reuse, retrofit or reconfiguration program, which brings me directly to presumption (b), that there is some economic advantage in reuse, retrofit and reconfiguration.

It may be difficult to prove with actual data, but in my exyperience I can find only three general reasons why code violations are not corrected. The first is that they are impossible to architecturally implement; widening a 7'–6" corridor in a bearing wall structure for example. The second is simply building mismanagement or indifference and the third is financial sanity. By financial sanity, I mean that a Hospital's Board has carefully examined the financial ramifications of major code work and found it uneconomical or impossible to finance. In other words, presumption (b) may also be false.

You may ask, but if violations exist, how is it that the beds are open. There are a number of reasons, some of which this gathering may wish to consider for wider application. The first reason is one that we all know, building officials seem to be a little less vigorous with respect to existing structures than with new structures. No one wants to bear the responsibility of shutting off a respected community asset or interfering with significant financial power.

The second reason is that some progressive states have recognized the burden of the changing code and have legislated a negotiated path. New Jersey is a good example. The Department of Health in Trenton recognized two types of violation—structural and comfort. Structural violations refer to those types I identified as dealing with life safety or life protecting. These must be corrected immediately. Violations of amenity portions of the code are not cause for closure. The State notes that while these may interfere with hospital operation and efficiency or patient comfort and convenience, they do not compromise patient safety. The hospital is asked to prepare a long-range plan which addresses a phased strategy for correction in manageable chunks. New York took a similar task recently in its enormous rewrite of its health code, developing separate codes for existing and new facilities.

The third reason is that the states, who have the constitutional right to implement building codes, simply let their standards fall behind. Buildings that might be nonconforming in New York under their new code, would be okay in New Jersey which essentially uses HRA 76–4000.* In Pennsylvania, the same structure would be in terrific shape under the 1969 code.

Returning to the main point, I have to my satisfaction, if not yours, demonstrated that there are few sound reasons for considering older structures as candidates for reused, retrofitted or reconfigured acute care hospitals.

That leaves the possibility for other health uses, and it is here that the prospects brighten considerably. Today's medical care is forging into many new directions and some of the most promising gains, in terms of total numbers of people affected, are happening outside the hospital.

John Knowles, in his article in *Doing Better Feeling Worse: Health in the United States* notes that more than one half of the reduction in mortality rates over the last 300 years occurred prior to 1900 and that magnificent medical breakthroughs aren't likely for the duration of this century. Occasionally, we hear of marvelous cures and we somehow feel safer. Most recently we have been heartened by Jonas Salk's potential advances against multiple sclerosis, yet despite the relief for the afflicted it is a small advance in the face of the total population. Dr. Knowles points the finger exactly where it needs to be. The title of his article is *"The Responsibility of the Individual."* Major reductions in morbidity and mortality rates can only be made by each of us. The major killer diseases and their causes are reasonably defined:

- smoking causes lung cancer,
- alcohol causes liver disease, ulcers and cancer of the esophagus,
- obesity causes hypertension and cardio-vascular disease,
- and, to consider every vice, promiscuity is highly correlated with cancer of the cervix.

The medical hero's of tomorrow may well turn out to be Smokenders, Alcoholics Anonymous, Weight Watchers and Masters and Johnson, who brought us techniques to stay sexually happy at home.

And what does all this have to do with reusing health facilities? If reuse of our health facilities as hospitals is not sensible because there is no need for outmoded beds and there is also no financial sanity to the venture, the only viable option is to reconfigure our older hospitals for desparately needed alternate medical functions.

If there is a 6 or 10 percent surplus of acute hospital beds, it should be equally well known that at least 6 percent of the United States population suffers from alcoholism. Medical detoxification is essentially useless, but if combined with a 21 day in-hospital milieu therapy environment, recidivism drops to 15–20 percent. Yet there are few hospital facilities that provide this type of treatment. Most of the problem lies with third-party payers who have no provision for rehabilitation. Where limited programs exist, such as New Jersey, reimbursement is at hospital rates and the building codes follow suit. Milieu settings must meet existing general hospital standards. That can only be considered as code overkill and obstructionism.

Physical medicine and rehabilitation are another serious lapse in American medicine. We have marvelous facilities for saving the life of a stroke or infarct patient, for bringing a trauma or burn patient back from the brink of death, or for hiding paraplegics, quadreplegics, amputees and birth defective children in homes, VA

* (HRA) 76-4000 Minimum Requirements of Construction and Equipment for Hospitals and Medical Facilities. (Recently revised as (HRA) 79-14500)

hospitals or mental hospitals. Yet when those 21 days of acute care reimbursement expire, we seem to forget how much an intermediate term physical medicine facility can do in returning these patients to society with productive pride. Again, third party payers must bear the brunt of the responsibility, but as was the case with alcoholism, where programs do exist, building codes dictate hospital standards. Surely in the face of a tremendous need, standards can be relaxed.

I could speak of many other sub-acute problems, hostels for terminal patients, phychiatric crisis intervention centers, homes for the aged, dignified caring facilities for women who choose abortion, chronic care needs or front-line emergency/primary care stations tied to a central hospital for those hundreds of small towns who will be losing their small, inefficient and outmoded hospital emergency rooms in the next 10–15 years.

These activities, to me, seem appropriate areas for this conclave to concentrate its attention. As we contemplate reuse, retrofit and reconfiguration, let us consider that we are also innovators. I would be disappointed if I thought we were primarily here to discover slick techniques to justify the continued existense of underutilized, inefficient and poorly equipped hospitals. I would be angry if I felt that my introduction to codes and standards was expected as a sanctioned tirade against the unfairness of these to the struggling voluntary.

My final charge from Mr. Parker was to formulate some specific recommendations in the area of codes and standards as they effect the reuse, retrofit and reconfiguration of health facilities and also to suggest research topics for additional future study. I believe there are five areas, and I will briefly summarize them as tersely as possible.

1. Nothing should be done that in any way comprises the requirement that every health facility expeditiously incorporate the latest in life safety codes that have a demonstrated life protection nature. What needs more detailed study, however, is a clear description, identification or measure that can separate codes and standards into life safety, adjacent property protection and amenity clauses.
2. Clear identification of the purpose of each code requirement will allow progress in a second area. Everything should be done to develop a discrete set of codes and standards, such as those in New Jersey or New York, that allow continued operation for hospitals that meet life protection standards but fail to meet amenity standards.
3. The use of strict enforcement as a positive tool to effect a sound area-wide health system plan needs to be investigated. I feel that nothing should be done to those portions of codes or standards that make it difficult for underutilized, underequipped and inefficiently operated hospitals to stay in business. The question is how can codes be used or should they be used, to move towards an acceptable, accessible, economical and higher quality medical facilities system instead of more solid and pleasant individual buildings.
4. Everything should be done to develop a set of standards that recognize the need for the sub-acute condition and demonstrate the safety and sensibility of applying sub-acute building standards in such settings. A great deal of research needs to be done, however, to more clearly relate the treatment of certain illnesses with safe and appropriate physical settings. Existing hospital or nursing home standards should not be rotely applied to all health settings.
5. And finally, solid and in-depth study of the economics of health facility aging is one study area that could quickly provide less subjective evaluations of when to proceed with reuse; retrofit or reconfiguration. Health Systems Agencies, for example, are often called upon to select between alternate proposals on the basis of which is the most economical, yet there is almost no evidence of a scientific approach or economic data base that enables such judgments to be made logically. Clearly tested and accepted mathematical models are needed just as badly as is a uniform data set of facility, capital and operating costs.

As a closing, we might consider Americas infatuation with perfection. New York is rather proud of the fact that since they tightened the nursing home building codes, almost no new homes have been built. I find that admirable unless there are New Yorkers who need those beds. It is possible that a compromise might give many more some care, than just a few, perfect care.

Is it not possible to develop reused, retrofitted, and reconfigured hospitals for medical underserved problems in less than perfectly appointed buildings with 18 rooms at every nursing station and 10 square feet of passive, active and multipurpose space for every patient?

I hope the focus of my remarks point to a concern for intervening in health problems, not just building, or hospital or code problems. In the end, its not the buck or the kick that brought us into the fringes of medicine; its much more the concern for quality, safety and compassion.

Codes and standards panel reaction

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I am in basic agreement with Mr. Reuter's paper, especially his thought that all model codes have nowhere near the problems of Public Law 93-641. He is quite correct in his statement that code application and enforcement is, by far, the major issue requiring further study.

He states, and I agree, that amenities, functional necessities, and physical obsolescence of a structure are far more costly than correcting code violations. Priorities must be kept in mind, and money spent where it is needed most. Life safety may be secondary to the provision of basic and nonexistent health care services in certain situations.

The current Consensus Codes, Standards and Regulations have very little to do with the cost of health care delivery. The problem mainly lies in the fact that we have designed and built a health care system that we appear to be unable to pay for. The record of past planning programs indicate that:

- We advocated the full service hospital and the end of the specialty hospital. We are now questioning this wisdom.
- We advocated a complete range of services from intensive to acute to long term care under one roof in progressive patient care. This may have resulted in better care, but most assuredly, increased costs.
- We advocated ambulatory care, OPD, HMO, etc. Those who built them had to do a hard sell marketing job to make them at least break even.
- We advocated that only the specialist be permitted to function within our hospitals, so much so that our general practitioners almost disappeared. Our medical schools have produced an overabundance of highly and expensively trained specialists such as surgeons, just at the point in time when we are investigating the impact of unnecessary surgery.
- We advocated privacy, dignity, safety and quality of patient care. These are generally not even mentioned today unless to say that we expected too much.
- We advocated preventive medicine (see your dentist twice a year, have an annual physical, a routine chest x-ray—make people aware of symptoms, early detection of disease is vital, when you spot a symptom run to your doctor before it's too late. We are now allowing that this is excessive use of the system. To some degree, this system worked so well that people who would have died early of an inexpensive disease, are living longer to die of an expensive disease.
- We advocated that high quality medical care was a right and not a privilege reserved only for the wealthy. This seemed a good idea until people started to use the system who never had before and a taxpayers' revolt resulted.
- We advocated modern approaches to the diagnosis and treatment of disease (i.e., new drugs, new therapies, and new diagnostic devices). We are currently producing new, improved models of these at an almost staggering rate. We are now saying "don't buy them." It doesn't matter if they are better, noninvasive, safer—they are too expensive!!
- We believed that careful planning was the answer. From the post war planning commission we set up State Hospital Review and Planning Councils, Regional Planning Councils, Comprehensive Health Planning Organizations, Health Systems Agencies, all with little or no effect. Perhaps it is not possible to structure health care in an unstructured society. At any rate, health care planning until this date has been totally ineffective. Most of us never realized, apparently, that we were building a health care system that we could not, or are not willing to pay for. It probably would have occurred to us sooner or later that this was so, but the realization was greatly accelerated by the generally poor economic condition of the country (i.e., inflation, high cost of energy, balance of payment deficit, slipping dollars, slipping stock market, unemployment, etc.). It is not a coincidence that the shortage of beds and doctors became a surplus of the same in 1973. At this same point in time, Con Edison went from "Light a Light—Stop a Thief" to "Save a Watt."

Of interest, in the new testament of the Bible—the Gospel of St. Luke, chapter 14: verses 28–30:

> "For which of you, intending to build a tower, sitteth not down first and counteth the cost, whether he have sufficient funds to finish it? Lest haply, after he hath

laid the foundation, and is not able to finish it, all that behold it begin to mock him."

There are those who believe that a complete moratorium on all capital expenditures would not reduce the cost of delivering health care. Indeed there are those who believe that the only way that we can bring about a significant reduction is to spend more money on construction and equipment. The only really significant savings would result by reducing the number of people who are employed in the health care field. This can be done by replacing manpower with capital; it can be done by providing less service, or by conditioning people to be more responsible for their own care.

30 Even though the cost of capital expenditures plays an extremely small part in the cost of health care delivery, I am not advocating that it be ignored, nor will I deny the terrible code dilemma. However, the major problem lies, not in the codes, standards and regulations, but in the enforcement of them. Some of the major areas of concern are:

1. Ignorance on the part of enforcing authorities (and some designers) as to the intent of the codes.
2. Duplication of effort by enforcing agencies—overlapping jurisdictions, conflicting interpretations, zealots and true believers who demand the letter of the law and an apparent competition between enforcing agencies as to who can find the largest number of technical violations.
3. A tendency of many enforcing authorities to demand more than the minimums prescribed in the code. I have referred to this as the increaser-syndrome, "if 30′ dead end is safe, 20′ is safer" and the PYA (Protect Your Ass) syndrome, "if I am going to approve it, it has to be my way, because I have the say, and I am responsible;"
4. Tunnel vision—each separate reviewer is blinded by his own prejudices or interests. If it is fire safety, all else must be sacrificed to achieve it.
5. Improper application of the code. The Life Safety Code is currently being used by many jurisdictions to close down unwanted facilities or service areas. This is not the intent of the drafters of the code.
6. There is a point of too much safety. This point is reached when people are unwilling to pay for it and will not have their liberties restricted to achieve it. We have already acknowledged this "right to risk" exists for the normal citizen. We are not sure about the same right for the custodial citizen. I could assure the safety of anyone from dying in a car accident, however, such assurance would be coupled with an extreme restriction of that person's liberties. They would not be permitted to set foot in a car or to be within 100 feet of any highway.

We are faced with a panic reaction to the fact that controls have not worked, in fact have been counter-productive. Hence controls are out of control. Unfortunately, the major effect of Controls out of Control is to slow down the design and construction process. Time is the worst enemy of cost control. The longer it takes to program, design, get approvals, and construct a health care facility, the more expensive it will be, the more obsolete it will be, the longer the people will be without services, the longer the institution will be without income production, and the more they will have to pay for money.

The Life Safety Code is a minimum code, improving with each edition. It is tending to become more based on fact than on opinion. Efforts are being made to remove requirements which are unnecessary, redundant, or of questionable value. Rated on a scale of 1 to 100, the new sections of the code will provide only about a 95 percent probability of success. (100 percent is not practically attainable.)

The code recognized equivalencies, many enforcing authorities do not. The National Bureau of Standards system will go into the next edition as one method of equivalency. However, the concept has always been in the code.

The major problem with recycling a building or altering it for a new or upgraded purpose, I submit, is not that of code compliance. The major restraining factor would be that the building does not lend itself to any change within the economic parameters of good practice.

Any change can be accomplished, but the price of such a change coupled with time lost, revenue lost, and a compromised plan which does not function economically, will lead the intelligent designer to reject that solution for some structures and for some purposes, or functions. Certain structures lend themselves very well to recycling. Generally, but not always, warehouses make very good hospitals or health care facilities, or any other building type. Dormitories sometimes, but not always, make excellent ambulatory care centers. The point is, however, that there can be no blanket formula, each structure must be evaluated separately and an intelligent decision made as to whether it is more economical, in the long run, to alter it, recycle it, add to it, or demolish it.

It goes without saying that we must all work to provide effective, yet economical health care services and house them in appropriate facilities. Today, economics seem to be the item of primary importance, even more so than the quality of patient care. However, if we cannot afford to provide these, we at least should not create conditions which may be (to coin a phrase from the Surgeon General) "hazardous to their health." For as Florence Nightengale said over 100 years ago, "It may seem strange that the first principle in hospital design is that it should do the patient no harm."

Codes and standards panel reaction

Joseph G. Sprague,
American Hospital Association

Mr. Reuter implied that there is very little that can be done about the building code problems—that we must accept the products of code writing committees without challenge. There is, however, a great deal that can be done. Perhaps the most obvious effort would be for concerned individuals to become involved in the code development process. Knowledgeable individuals with a willingness to become involved are generally welcomed as part of the code committees. Sometimes this involvement is only advisory, but several code writing bodies that follow the consensus principle, such as the National Fire Protection Association (NFPA), will allow the participation of individuals representing organizations whose primary concern is safety in facility construction. Those with less expertise and/or time may express their concerns through written public comments for changes, and reviewing early drafts of codes usually made public before being finalized. There is also the public forum, either through hearings or a floor vote, where additional amendments can be considered. Early involvement by individuals with a knowledge and background in codes brings credibility to the code development process.

I fully agree with Mr. Reuter on the serious problem of code interpretations. Enforcement is not at all uniform in all sectors. Some of this is bluntly the result of ministerpretations by individuals who seem to be trying to write their own code. It was brought out that the Life Safety Code NFPA 101 requires judgment for proper implementation. When a set of codes and standards is written based upon knowledge and a commonsense approach is taken in code enforcement, the problems of implementation, interpretation and application of codes will always arise. The first aspect to this problem is that the people who implement the standards come from a variety of backgrounds, experiences, and training. Therefore, it is logical for them to have different views on the standards' intent. This creates inconsistencies in implementing a requirement from one jurisdictional area to another. When the surveyor has inadequate professional experience, the interpretations will often be rigid or inflexible. When a standard is written and implemented with no room for interpretation, the resulting inflexibility creates additional problems. Perhaps the solution should be orientation and training material with better communication between the standard writers and the standard implementors. Correct and consistent application can only be made if everyone has a clear understanding of code intent and purpose.

I generally agree with Mr. Reuter's position that retroactive code requirements represent a major problem. However, Mr. Reuter suggested that certain parts of new codes should be retroactive where life safety can be demonstrated to be a real factor. The problem is to demonstrate the real life safety effect of specific provisions, and to weigh that against the financial burden of retroactive compliance. I believe that code requirements should only be retroactively applied in exceptional or clearly documentable situations jeopardizing life safety (which is often very difficult to do). Certainly no requirement should be automatically retroactive.

Mr. Reuter stated that in every case remodeled and renovated buildings should include conformance with the latest codes. I would argue that the issue is not that simple and that both life safety and cost impacts need individual study before any retroactive compliance is considered. For example, when a hospital is originally built, it is made to conform to all known standards required by the various jurisdictional authorities. When a minor change is made in one area through remodeling or renovation, it is ludicrous to require that the entire hospital be brought up to the latest code requirements. The use of equivalency, waiver, or variance concepts must be considered.

Standards are written and implemented in order to provide a level of safety. Because of the exact contribution of any one isolated requirement to that level of safety, different combinations of requirements can create equivalent levels of safety without mandating specific requirements in every single situation. Requirements in different combinations which are often much more economical yet provide the same level of safety, should be considered. The National Bureau of Standards, for example, is currently developing an equivalency system for the Life Safety Code in which this approach is taken.

Building codes should not be used as a means for closing existing facilities in order to meet broader planning objectives. Health Systems Agencies planners should have their own sanctions and should not have to fall back

on code enforcement, which is not within their range of expertise. Codes were not written or intended to be used as leverage by planning agencies to accomplish economic and political objectives such as closing existing facilities. The basic issue is one of insuring quality and safety in the health care facility environment, and accomplishing it at a reasonable cost. Obviously we cannot afford perfection but we should go as far as is reasonably possible. Where a number of facilities in a given area are reviewed and are found to be equally needed, the one to be reused or renovated would be the one in the worst condition. A survey of code non-compliance could clearly define the construction priorities in those cases, but, it is a mistake to close a facility with no consideration other than building and Life Safety Code violation.

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In reaction to the discussion on the panel topic of codes and standards, here are some additional notes concerning the research agenda and policy positions:

1. implement adequate training or inspectors for consistent and proper enforcement;
2. *codes* should not be used to close unneeded facilities;
3. the Joint Commission on Accreditation of Hospitals (JCAH) and the Department of Health Education and Welfare (DHEW) should have a single reference;
4. there should be a reduction in the number of enforcing authorities;
5. full recognition must be given to the fact that P.L. 93-641 priorities do impact codes;
6. there should be a limitation on retroactive code enforcement;
7. there should be a central, knowledgeable clearinghouse for all federal construction and safety regulations affecting health facilities;
8. There should be "sub-acute" standards for facilities that do not require full compliance;
9. cost impact statements should be required when regulations are proposed;
10. the system of checks and balances seems to have gone wild, and it is time that the federal government put its house in order;
11. disincentives for code compliance should be removed before incentives are provided;
12. the reimbursement mechanism on dollars for code compliance is totally chaotic;
13. government policy sometimes seems to be that "anything worth doing is worth doing over and over."

Codes and standards panel summary and recommendation

Grady Smith
D.H.E.W.

The participants agreed that there are too many different codes. Additional confusion may be caused by use of different issues of a code. (For instance, some authorities reference National Fire Protection Association (NFPA) 101 Life Safety Code of 1976; others reference the 1970, 1973, or 1976 issue of the same code.)

It was recognized that a single code applicable to all sections of the country may be impractical because of different local conditions as well as the desire for individual recognition by regional or local authorities. Past attempts to develop a "uniform" code have usually resulted in additional documents, rather than reducing the number of existing codes. It is very likely that any attempt to provide a new combined code would have the same result today. It was also recognized that authorities will usually select one of the nationally recognized codes as a basis and add or delete to that document as appropriate for their perceived local needs. Unfortunately, time required by the regulatory process may make it difficult to update local requirements as rapidly as new issues of national codes become available.

The group was emphatic that at least the Federal Government could and should get its act together, and agree on which code and which issue should be referenced by Federal agencies and departments. Specific note was made of the fact that Medicare/Medicaid in the past has used 1967 codes even after 1973 and later issues were available.

It might be noted that the Federal Government also has problems with the regulatory process. Medicare/Medicaid is required by law to utilize NFPA 101 Life Safety Code of 1973 for nursing homes with the understanding that existing nursing homes approved under the 1967 Life Safety Code will continue to be accepted.

In the case of hospitals, however, the law is not specific. Medicare/Medicaid is required to develop regulations which are generally consistent with requirements for nursing homes. As soon as the act became effective to require the 1973 Life Safety Code for Nursing Homes, work was started to similarly revise the regulations for hospitals—we understand that these regulations are still in the administrative review process. Until the regulations are finalized it might be that the 1967 Life Safety Code could be considered as requirements for hospitals —while the 1973 Life Safety Code is mandated for nursing homes—and the 1976 Life Safety Code is in general use.

On the other hand, it should be recognized that Congress had no way of anticipating such problems. Their reaction to the initial suggestion to use the "latest issue" of the National Fire Protection Agency Life Safety Code 101 was that requirements of such future documents may or may not be reasonable and acceptable. It was assumed that later issues could be used where appropriate for clarification and/or interpretation of original intent. But, substantial changes that might significantly affect the safety of the patients would need further consideration.

Present staff of Health Care Finance Administration (HCFA) who are responsible for implementing life safety requirements are accordingly now using the 1976 issue of NFPA 101 Life Safety Code where possible. Unfortunately, there may be questions in some minds as to which of the revisions or changes might be considered substantial and therefore inappropriate as a basis for interpretation of legal requirements. This question on occasion may affect local preliminary decisions—to the confusion of the average administrator.

The panel further emphasized that a central group of the Federal Government could and should develop uniform references in code utilization for assistance to States. This might be ignored by some of the larger more sophisticated States, but many States would welcome a chance to incorporate some national standard by reference. Presumably, such a central group would review on a regular basis the various national code requirements and document differences with appropriate comment.

An example of where national leadership might be useful would be the question of requiring door closers on all hospital patient room doors opening on corridors. The Uniform Building Code (U.B.C.) requires automatic closers on the assumption that these doors should be normally closed to minimize the danger of smoke in the patient rooms. NFPA 101 Life Safety Code committee emphatically rejects this requirement on the basis that daily patient care would suffer, whereas a fire situation in any specific hospital is a rarity. In other words, if patient door closers are used, the lack of visibility into the patient room by the nursing staff

could affect the promptness of staff reaction to medical emergencies with a negative result for the patient's overall safety. It is recognized that there are closers available that would overcome this objection, but at this time, they are very expensive and cost benefit possibilities must be questioned.

The conference participants were emphatic in their concern about arbitrary enforcement and lack of uniformity in interpretations by code officials. The intent of most codes is recognized as reasonable. Unfortunately, there is an overabundance of legalistic individuals who are more concerned with words and punctuation than with intent. Other authorities will arbitrarily make up their own requirements based only on personal preference. This problem occurs in Federal and local governments and should be addressed in detail.

The section on recommendations for research calls attention to the fact that present training procedures for individual enforcers has not completely resolved this problem. The total approach needs to be studied.

It was noted during discussion that from time to time, suggestions are made to provide a national Federal code in lieu of referencing 101, etc. While this might be done, the overall desirability should be questioned. One major concern is the tremendous expense and manpower required to keep such a code reasonably up to date. Most code bodies exist on a voluntary basis with minimum membership expenses. It is doubtful if the Federal government could properly utilize such voluntary efforts and there may be question about reliance upon otherwise essential financial appropriations. Federal and military code specifications for materials have been useful in the past for trade needs but are usually inappropriate for general construction. A compromise might be possible in utilization of a common document—such as Health Resources Administration (HRA) 76-4000 "Minimum Requirements of Construction and Equipment for Hospitals and Medical Facilities"—which includes specific Federal requirements but avoids redundance where possible by also referencing National building codes. Some consideration is presently being given to this concept but again, we are faced with the problem of agreement between agencies as to what will best satisfy their individual programatic needs.

Another point emphasized was that there are too many enforcing authorities. Horror stories continue to be told about projects that must be reviewed by 30 to 35 different agencies. There is no question that most of these have special and important interests. For instance, the sanitarian is concerned with provisions for sanitation in the kitchen, where as the fire marshal is concerned with fire separation and extinguishing systems. But, it would seem that one well trained individual could perform many different inspections. It is difficult to understand why JCAH, Medicare/Medicaid, licensing personnel and the fire authorities should each have to perform separate inspections that are all related to fire safety construction. In some states the fire authorities will accept the certification of appropriate federal or state agencies but others insist upon separate inspections. In some instances, where there is a reluctance to delegate inspection authority, at least the inspections could be accomplished concurrently.

Another major problem exists where approval will not or cannot, be given on the basis of plans and specifications. Instead, the authorities may insist on delaying review until the project is complete. Where interpretations are not crystal clear, the designer may provide what he believes is proper and adequate only to have someone at a later date tell him to replace the recently completed work. Aside from the unnecessary expense of replacing new work, this practice tends to force designers to stay on "the safe side" and over-design any detail that might be questioned.

A specific recommendation was made that independent groups such as Joint Commission on Accreditation of Hospitals (JCAH) should work more closely with Federal and State authorities to minimize confusion, duplication, and conflicts in codes. At this time, JCAH construction requirements reference NFPA 101 (some say different dates of issue are occasionally involved). Reference to space in general is subjective with questions such as "is space adequate"? Without a definition of "adequate," it is quite likely that a Federal planning methodology may at some time determine that a JCAH approved space is really inadequate. This problem can and should be forestalled.

A suggestion was also made that there be consideration given to providing different requirements for different building sizes even though they may be in the same category. An example might be a small, 40-bed, one-story hospital where every room is within 20 feet of an exit to grade in a mild climate compared to a 400-bed ten-story facility with minimal exits, located in Alaska.

There was some discussion of the "Decision Tree" process for life safety code as proposed by Mr. Burgun some years back. This establishes levels of protection without regard to building type. The authority would choose the level desired for that area. He might utilize, for example, level "A" for hospitals and level "F" for short order food service facilities. This seems to have potential but problems are complex and have not been satisfactorily resolved.

Also discussed were the equivalency standards being developed by National Bureau of Standards (NBS) with assistance from DHEW. This would list or otherwise provide for tradeoffs in design. For instance, a complete sprinkler system might be more economical than 4-hour fire resistant construction and provide equal or equivalent protection. NFPA is also interested in this concept. If it is properly completed, it may become a part of the 101 Life Safety Code.

Subject of costs came up repeatedly and suggestion was made that the costs of code items be detailed. This is admittingly a complicated question which has deferred detail resolution. A DHEW group is presently looking at

the broad picture and may or may not be able to come up with some meaningful suggestions.

The point, of course, is that the authority having jurisdiction must be able to weigh the cost against the anticipated results if a truly rational decision is to be made. The question of cost is complicated but it should be answered as accurately as possible.

A very good suggestion was made that there should be developed, a series of books, films, etc., to explain why code items are included and specifically why changes are made. This might be part of the training for inspectors mentioned earlier, but here the primary audience would be architects, engineers, owners, and the general public. Most individuals are in agreement that a reasonable level of safety should be obtained. Resistance occurs generally when requirements seem arbitrary and capricious.

General discussion covered several other items, some of which strayed into the concerns of other work groups but all seem worthy of note even if occasionally redundant.

1. Administrators, States, Federal and other concerned groups should become involved in the code developing process. Entry is not difficult for the knowledgeable individual who is willing to contribute. The introduction sheets of code books usually contain the addresses and procedures for inquiry.

2. Building codes should never be used as a crutch to close facilities. If the facility is unneeded, the authority should so state rather than looking for obscure code deficiencies (no building is 100 percent perfect). On the other hand, if a choice must be made between two facilities of equal capabilities, and community need the physical condition may be a factor.

3. Retroactivity should be absolutely minimized consistent with acceptable levels of safety to life. Protection of property should not be an excuse for retroactive application of codes.

4. There is a real concern that Health System Agency (HSA) planners are becoming "instant experts" and may be making improper decisions based on inadequate knowledge. It was urged that limits of HSA responsibility in regard to technical design, engineering and fire safety be clearly delienated.

5. Again, a request was made for uniform central interpretations including requirements for accessibility to the handicapped, occupational safety, safety for health, etc., as well as general building codes. NFPA and other national organizations do have provisions for official interpretations but these usually involve a time consuming balloting process. Unfortunately most individuals need immediate answers. Often it is more economical to build in for excessive interpretations than to delay the project for formal discussions.

6. It was recognized that the present NFPA 101 purposely does not guarantee 100 percent protection. To do so would create buildings of fantastic expense—which would be uncomfortable or impractical for utilization. Most agree that it does provide an acceptable high level of protection. Further additions may provide very little added protection at a great deal more cost.

Separate items noted for possible research were as follows (some are expansions of study recommendations):

1. Interpretation of code language intent is still a major problem. Medicare/Medicaid did conduct a series of national training sessions utilizing a common panel of instructors. There is no doubt that this was helpful but the problems of diverse interpretations nevertheless continues to exist. Perhaps there could be research on training procedures that might be developed to achieve a reasonable uniform result. 35
2. There should be research to establish a basic analytical method to arrive at a go/no go determination for modernization viability which can be applied to any specific project.
3. One person suggested that provisions be made for the Federal Government to override unreasonable local codes using sanctions of funding approvals, etc. Arguments could be made pro and con, especially against Federal interference, but perhaps nationally acceptable guidelines could address specific problems.
4. Apparently, there are major problems with reimbursement mechanisms which discourage renovation and retrofit, which should be studied in detail for appropriate suggestions for improvements.
5. A "canned" training program might be developed for HSA understanding of code problems. This could be films or slides designed for basic understanding by a nontechnical audience.
6. Another expressed a concern of the extent that the Federal Government might reorganize code activities without a "takeover."
7. Building codes of other countries should be studied and evaluated as to their effect on the quality and cost of care. While we may be well ahead of other nations in total efforts there is no question that we could benefit from some detail differences.
8. The reimbursement problems as they may affect-conversions of a hospital to nursing home should be explored.
9. A final suggestion was that meaningful research on effects of codes on efficient operation of a facility should be done. Rightly or wrongly many individuals are convinced that codes restrict essential coordination of material and personnel traffic. The answer could affect improvements in code language or at least emphasize responsibilities of the designer.

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Critical issue panel on systems approaches

1. Position Paper by Ezra Ehrenkrantz, F.A.I.A.
2. Reaction by Marvin Mass*
3. Summary and Recommendations by Joseph Shein, A.I.A.

* Note: Professor Frederick J. Trost and Mr. Howard Yarme contributed to this panel as Reactors; however, separate papers were not submitted by these individuals.

Systems approach panel presentation: "I'm paid for, use me"

Ezra D. Ehrenkrantz, F.A.I.A.
Chief Executive Officer
The Ehrenkrantz Group

The design process has not changed much over the last few decades despite a growing awareness of the dynamic nature of our society. When we talk of form following function, we invariably talk as though a building's functions will be set at the moment of conception, and never change. Historically, the pace of behavioral evolution has been sufficiently slow to allow the requirements for the initial configuration of a building to continue to be used during its amortized life. Indeed, in many cases, the time space has been much longer than that.

Designing buildings to meet the specific requirements of their users has become more difficult as these requirements have grown more complex. Each new generation of users has tended to require new spaces. The rate of change has increased to a point where staff requirements vary between the date of programming and the date of occupancy. As a result, significant internal alterations are frequently required to adapt a building to new perceptions and requirements upon obtaining occupancy. At the same time, the rate of change itself continues to accelerate. We are all aware of future shock. The ability to design new facilities which will be useful and efficient, at least during their amortized life, has now become a serious problem which must lead us to question the way in which we approach the design of buildings.

Traditionally, the design process was one in which the architect took the lead in concert with the structural engineer as chief assistant. The service portions of the building were made to fit as best they could to meet the specific requirements of the buildings opening configurations. The design approach was predicated on a fixity of plan and purpose, which the building process itself did much to reinforce. As the contractors built the project, the structure and enclosure would be put in place first. Services would be scheduled to fill in the space within the interlaces of the building—within walls, between floors and ceilings, and occasionally in predetermined chases. Each individual service sub-contractor knew that he could make money if he got on the site first. He would then run his ducts, pipes or conduits in the most direct way to all of the required outlets. No attention was given to providing appropriate space for those services which would be put in place later. The first ones, therefore, had a straight run ,but the ensuing ones needed many angles and elbows by which to negotiate the initial installations, within a relatively cramped space. This was the result of the special bond linking the architect and structural engineer as the two essential generators of the design of the building, and relegated the mechanical services to a secondary position. Although today a much greater proportion of the building budget is devoted to mechanical services, design approaches have not yet taken this into account.

Within the last 10 years considerable progress has been made in the understanding of these problems. The most viable evidence of this is the adoption of the low-rise horizonal, deep plan which combines interstitial space in a modular plan. The most notable examples include the Greenwich District General Hospital in London, designed by a Ministry of Health team in the late 1960's; McMaster Health Sciences Center in Hamilton, Ontario, designed by Craig, Zeidler and Strong, also in the late 60's; and the VA Hospital at Loma Linda, California, designed by BSD in joint-venture in 1972. There are at least thirty-five other projects which generally adopt the modular interstitial concept. Of course these are all brand new facilities, and so for the most part they are unhindered by the complexities of reuse and reconfiguration. Nevertheless, these projects are significant because they demonstrate strategies for improving the performance of hospital buildings.

If the concept for designing generic activities is not accepted practice in all good offices, at least the ability to utilize space for a wide variety of different activities is considered essential. The search for organized service system approaches has generated a variety of design concepts including the use of interstitial space to organize the movement of all appropriate service networks throughout a building. The articulation of these systems, whether they move horizontal or vertical through the building, and the ability to gain access to them without major damage to a building fabric, has become a major design concern. The requirements for services must therefore be met in a generic way. Buildings are now being designed so that there are available routings for all required services, even if the services themselves are not included on a given floor in the opening configuration. The locations for each service system can be fixed,

and reached by branch lines, which can provide for any set of requirements in any given space within the building at any point in time.

The clustering of different spaces whose service requirements are similar can save dollars in initial construction. The basic service networks however, must have the capacity to meet additional future requirements in order to provide flexibility for changing needs without demanding the actual installation of every service throughout the building. Buildings built in this way are amenable to change and updating. This means that the requirements of our dynamic society have some chance of being met, at least over the period in which the building will pay for itself. Unfortunately, the percentage of our existing stock of hospitals designed in this manner is still very small. We are therefore faced with the problem of meeting changing requirements for medical practice within buildings designed as though the medical practice of 1923, or 1953, were the end of a period of evolution. In buildings constructed in the 20's, one may find low in service but with considerable floor-to-floor height for the installation of new service. In buildings of the 1950's, we may find much lower floor-to-floor heights with service systems crammed into minimum spaces.

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Today we find that the inevitable has come to pass, and medical practice keeps on changing. But the changes made to our hospitals have invariably been made as though they were the ultimate changes. New services are squeezed in between the old ones. Pipes, conduits, ducts, no longer used, are capped and left in place, as new adaptations are made to the service system. The new spaces may be defined by new wall panels, ceilings, and contain new and modern furnishings which belie the fact that they are only accessible through arteries clogged by arteriosclerosis and which may require bypasses to alleviate the results of earlier remodeling projects. The idea that one can consider the remodeling and rehabilitation of health facilities as something which can be undertaken in relation to a specific point in time would be considered a laughable concept if applied to new buildings, and yet when we look at an older facility, it is still an accepted practice. The remodeling process must begin with the generic planning of new sets of services to provide a field from which the initial and succeeding requirements will be supplied. A bypass mentality abuses our buildings, instead of using them to advantage.

Most of our existing hospitals can be placed in one of three categories; they are either low-rise pavilions, tower-on-podiums or a variety of structures built at different times and connected in numerous unique ways. None of these types of buildings are designed to provide complex mechanical systems which could be easily maintained or changed. Nor do they generally have sufficient space for new service runs to be readily injected into the fabric of the building. One particular challenge is, therefore, the development of a range of strategies for the rehabilitation of these older structures to contemporary standards.

While each mechanical and electrical service and utility has its own intrinsic technical requirements and constraints, the objective of a generic service system is to organize these services so that they can be designed, installed, maintained and either disconnected or extended in the easiest way and with the minimum disruption to regular hospital functions.

All new services must be designed to further extension of areas of buildings other than those being rehabilitated, and they must be easily integrated with the service systems adopted in any replacement facilities adjacent to the existing hospital. So the framework in which new systems are considered must be far broader than the apparent scope of any specific project.

Given that most existing hospitals simply do not have the space to accommodate new services in the optimum way, it is reasonable to expect design strategies to call for dramatic additions to existing structures in order to house new services.

A major criterion for determining whether proposals for facility development should be approved, might well be their capacity to move from a fixed service to a generic service environment. If a facility is so circumscribed or bounded by initial design considerations, which have locked it into an obsolete service pattern, making it impractical to renovate for future flexibility, it is obviously less deserving of approval than another facility which has the capacity to be brought up to date.

We are in an era, when the costs of the service sectors of our economy, and health services in particular, have been increasing at a much greater rate than those of the industrial sector. Cost containment is the new national priority. In our hospitals the pressure for efficiency is on.

New design tools and techniques which will provide the proper adjacencies and service systems to move people and material efficiently through the facility will improve a hospital's ability to stay financially viable. Hospitals which cannot change and grow will become less economical with the passage of time. All other things being equal, therefore, we should give such hospitals the lowest priority in the expenditure of dollars for rehabilitation.

The trends toward the development of heavier levels of specialization in terms of intensive care or outpatient treatment, means that the operations and economics of an individual hospital may well change significantly over time, occasioning major internal changes. As we look at some of the most common responses to hospital rehabilitation, we find the filling in of the courtyard is one typical approach, which does not necessarily provide elbow room for future changes or routes for services. As important as gaining the extra space, is the ability to articulate the way in which the service networks flow through the building.

Another planning principle which may be valuable in the development of any plan for rehabilitation is the

recognition that hospital departments are a combination of required and discretionary spaces. Required spaces fill primary functions and their location is critical, but discretionary spaces, such as offices, may be planned in a variety of locations. The overall result is that discretionary spaces give departments room to grow. Alternately, if all discretionary spaces are removed, primary activities are paced together with no growth potential. As one goes through a cycle of changing or expanding existing facilities, it is therefore imperative that discretionary spaces continue to be located adjacent to primary departments. This calls for a rehabilitation game plan that does not permit the closing down of future options.

(Editor's Note: Investment of the remaining conference time.)

Let us take a look at how this kind of generic service network can be applied to each of the aforementioned building types.

Systems approach reaction

Marvin A Mass
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The words "System Design" as applied to hospital construction has many meanings depending on what it is applied to. It could refer to a system of walls and partitions which are movable and reusable; it could refer to a ceiling system which is flexible and accessible; it could refer to a structural and planning module; it could refer to a system of modular program areas which permit flexible use of space, or modular mechanical and electrical systems and permanently assigned spaces which lend themselves to program changes.

When planning new construction, the use of "System Design" is relatively easy to accomplish, and space programs for mechanical distribution are planned into the structure to allow for future changes. In planning a "retrofit" project however, this concept is more difficult. To begin with most of the older hospital facilities were designed and programmed for its previous use. Mechanical spaces and systems were not designed for future flexibility nor space allotment for future change.

It therefore becomes apparent that when existing facilities were to be modernized we always talked of using the existing facility for a downgraded task which required less space, lower quality of facilities and mechanical sophistication. If this concept was to continue to the next stage of modernization, we would eventually downgrade the space out of useful existence.

Why does this occur? Basically, the reuse of existing facilities is emotionally and economically desirable because the space already exists. If however, the use of this space means a constant downgrading of previous uses, this can only occur for a limited amount of time, and may in fact mean throwing more good money after bad.

To apply the "Systems Approach" to existing facilities means a complete rethinking of area use. The building system must be flexible enough to allow both vertical and horizontal conduits for future expansion of mechanical facilities. Spaces must be assigned which will allow for future program changes with minimum interference of functions.

One way of accomplishing this in-hospital retrofit is by not trying to trade square footage of existing facilities for square footage of new use. By trading off areas of existing facilities and assigning them to "programmable system areas" (as in new construction), the future of existing hospitals can be extended and the use of the "System Design" in existing facilities can provide the flexibility and life cycle use of comparable new construction.

Systems approach panel summary and recommendations

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Presentations

Let me first summarize the report by our presenter, Ezra Ehrenkrantz, who began by outlining ideal conditions and desired parameters for designing a new structure, specifically a structure for a hospital or health facility. He said we should design for generic activity. If we cannot design and build for generic activity, at the very least we should be able to utilize the resulting space or building for a variety of activities now or in the future, as our needs change. This search for organized but flexible services, for a systems approach, has generated many solutions. You are familiar with some of them, including the interstitial solution. The end product (design) should organize the placement of appropriate service networks throughout the hospital to define areas that could be changed. These networks include circulation paths (i.e., for materials management, handling, etc.) and also pathways for mechanical systems. This genre of building solution of reorganized networks, has the capacity to meet traditional and future needs. If one had to change such a facility, one could change easily, or certainly with a minimum of problems. We say these buildings are amenable to change and flexible use.

Unfortunately, very few of our buildings are constructed in this fashion. They were not built that way in the twenties nor in the thirties, or for that matter in the fifties or sixties, and the percentage of our existing stock which is flexibly designed is very low. We are therefore faced with the problem of meeting changing functional requirements in inflexible buildings. At this point, Mr. Ehrenkrantz showed a series of slides illustrating the difficulties of accommodating changing needs for mechanical services in typical hospital ceilings. Some slides even showed systems (i.e., piping, ductwork, etc.) placed below hung ceilings for lack of space above. These are the problems we must contend with, and Mr. Ehrenkrantz ended this portion of his discussion by asking how we retrofit such buildings, and further should retrofitting be done or not.

Years ago it was estimated that during the life span of a building—30 to 40 years—a hospital would spend two to five times the initial construction cost for changes and renovations. More recently, because of dramatic increases in demand for medical services, unforeseen change of medical technology, new programs, etc., it is more likely that a hospital or health institution would spend six to ten times the amount of the initial cost during the building's life span. (This estimate does not take inflation into account.)

Most of our existing hospitals, Ehrenkrantz continued, fall into one of three categories of physical configuration, low-rise pavilions, tower on a podium, or some combination of the first two. Few, if any, of these buildings were designed with complex mechanical systems which could be maintained easily, could be added to or changed. The architects' challenge is the development of a range of strategies for their rehabilitation. While each mechanical and electrical service has its own technical requirements and constraints, the objectives of the design should be to produce generic solutions. We strive for generic solutions in new buildings; we organize services so they may be installed, maintained and either disconnected or extended the easiest way possible. We must do no less for retrofit projects.

Ehrenkrantz concluded that if a retrofit project cannot be done in a manner producing a flexible and changeable facility, perhaps it should not be done. The title of his presentation, "I've Paid For, Use Me," is a prevalent attitude. Nevertheless, his message to owners, architects, the public at large, and reviewing agencies, is to step back and evaluate proposed retrofit projects in a different fashion, saying, "Can we produce a generic solution in this building, one with flexibility? If not, perhaps it simply shouldn't be done." Many of this conference's attendees have discussed this very topic and came to a similar conclusion, perhaps differently stated. The systems panel agreed in our meetings that the decision to retrofit or not requires some kind of logical "data" base and logical evaluation which could be a rating formula or other methodology to serve as a base line in judging these projects.

Following Mr. Ehrenkrantz's paper and discussion, we had presentations by two of our reactors, Frederick J. Trost and Howard Varnes. Professor Trost presented and illustrated a demonstration project which was completed in Dallas Presbyterian Hospital a number of years ago to see whether or not one could retrofit a hospital shell

space with a prefabricated building system. In this case a 22-bed nursing unit was required. The solution employed prefabricated units for the bathroom ("hygiene units"), a patient service module and walls. The initial installation was altered soon after completion to demonstrate the flexibility inherent in the solution. Interestingly, Professor Trost later said that a nursing unit was not suitable to demonstrate that the system selected was flexible. Once built, relatively fewer changes are needed on nursing units than on other departments. Indeed, since construction, the Dallas unit has never changed. He added that if the project were to have been repeated, they would have selected another more volatile area of the hospital (i.e., ancillary service, etc.) to restructure.

42 Howard Yarme illustrated the REDE Corporation's development of four separate projects. The first was a retrofit of a nursing unit in a Rhode Island hospital. His point was that one of the criteria of a systems approach involved an enlargement of the solution to account for behavioral characteristics of patients, how they function and how staff would function within a given nursing unit.

The other projects are closer to the subject of building systems. These involved development of microstructures, or prefabricated units, with non-proprietary elements used for ambulatory care facilities. Most interesting to me personally was the establishment of an ambulatory care facility within what was a supermarket shell. We were shown quite convincingly that the amount of general contract work was rather minimal, the work was done quickly and the demonstration of alternative solutions and physical arrangements and/or changes for an ambulatory facility was possible. Indeed, the solution was a rather handsome facility.

In both cases, Professor Trost's project and Mr. Yarme's presentations, facilities were developed which could be easily modified, which provided a variety of solutions, and which could be used in a variety of settings. These projects were cost conscious, because they used catalogue items which were not proprietary systems. Mr. Yarme also noted that projects undertaken in this fashion could be done incrementally and by different installers, using standardized but perhaps different projects to maintain a compatible and still consistent system.

One third reactor was Mr. Marvin Mass.* As an engineer, Mr. Mass has had very interesting problems involving mechanical services in retrofit. It was pointed out, not only by him, but also by Mr. Ehrenkrantz, that in many retrofit projects it was not uncommon that as much as 60 percent of the total capital cost of a project would be for mechanical services and work involved in dealing with mechanical distribution for these projects. He, therefore, very vigorously and energetically proposed that two considerations in retrofit were necessary: for one, the mentality of "fit it in somehow," after the architects have presented plans or proposed plans, simply doesn't work well. It might work on an *ad hoc* basis for a one-time-only solution, but if we are interested in producing a generic solution in a retrofit project, then real space must be allocated in a systematic way not only for service runs but for major mechanical equipment. This might even involve adding more space to the building. Mr. Mass' other suggestion in retrofit projects was for preparation of master plans for mechanical services just as we prepare master strategies and/or master plans for architectural space use. One HSA member pointed out that the guidelines of the HSA and its amendments certainly did permit and encourage such activities. Even if a project is a small one, for example, a retrofit for a small ICU, the mechanical engineering plans for it should be designed in context with a larger scheme for the entire building.

The panel was asked to consider energy conservation; how to do this easily in retrofit? Can it be done with a systems approach? Mr. Mass and the other panelists were unable to present a ready formula but noted there are no easy ways to do it. Energy conservation would usually involve converting existing systems in a major way because most existing hospitals were built to different standards which, though probably correct and conforming to the state of the art at the time, do not do so today.

Panel discussion

In the course of panel and open discussion, it became clear that there was no single definition of systems approach. The participants represented different disciplines and different interests and used the same vocabulary to talk about different things on several occasions. It was finally agreed that a systems approach was a state of mind, an approach to solving problems taking into account as many variables and functions beyond the immediate issues which are normally evident and decisive. On that level one could approach the problem of retrofit and reuse more generically. Rather than immediately think of an *ad hoc* solution to retrofit of a particular floor or space, the issue might be broadened to investigate whether or not the retrofit of this floor or space is needed and to what extent. For example, one panel member examined the patterns of surgical utilization in a hospital. If all surgeons want to begin operating at 8 o'clock in the morning and be out by 12 noon, perhaps 8 operating rooms are needed in this particular institution. On the other hand, it's not necessary to provide as many operating rooms if work is distributed in the course of a full day. Other examples confirmed the need to be very broad in approaches to retrofit to be consistent with a systems approach.

The panel also considered individual projects and their relationship to systems approaches. It was concluded that systems design would yield solutions which were changeable and generic in nature, rather than *ad hoc* solutions geared to a specific request at a given time.

Other issues discussed concerned recommendations for

* See also REACTION submitted M. Mass.

policy decisions and a research agenda. It was clear that review agency representatives awaited guidance in the development of criteria for judging existing buildings with respect to retrofit requests or applications. The remaining comments are addressed to those needs.

Policy conclusions

Prior to undertaking any project, there should be a careful evaluation of the existing structure to see if it is amenable to a generic solution. In other words, institute a rehabilitation feasibility study as a first step in any project. This would provide the base information upon which to decide what types of projects should be done and helps avoid the "one last remodeling" syndrome. In addition to the importance of such a study for the individual institution is the cumulative value of every institution's study in a regional framework. Formulation of a regional inventory is essential for regional planners and agency reviewers who must judge the relative weight and value of competing projects. Rehabilitation feasibility studies would also help justify doing a project with a systems approach with, perhaps, concomitant additional expenditures. They would reveal the lack of feasibility for systems methodology and could lead to conclusions not to proceed.

A second important conclusion is to establish and abide by the same, or close to the same, performance criteria for retrofit projects as we do for new buildings. There shouldn't be two levels of physical quality for a given institution, nor two levels of care which might result from that inequality. This conclusion must be tempered with other considerations. One is that there may be a desperate need for the project and no other alternates at the particular time. Or, it may be necessary to preserve certain buildings for their own intrinsic worth, such as historic preservation of important structures.

Assuming it is worthwhile to retrofit, it is essential to strive for as general a solution as possible, recognizing the strong possibility for continued renovation in the future. Let us develop generic solutions compatible with master strategies for space allocation; develop long range strategies for mechanical services within retrofit buildings; and consider hardware/equipment or building systems to be used within structures which will assure flexibility and allow changes.

Another conclusion reached is that planners and institutions should consider retrofit of non-hospital facilities as these may be much more amenable to fulfilling systems criteria than existing hospital spaces. The Lutheran Hospital of Brooklyn is a good example of that philosophy. Loft buildings come equipped with well-sized structural bays and generous floor-to-floor heights. Also, they can sustain just about any desired floor load. They often have sufficient area and more than likely have good floor configurations which can accept large departments in a compact manner. As a matter of fact, these considerations are usually appended as criteria for new construction.

A final consideration is that, even if a health facility has outlived its usefulness, one should be able to recommend reuse of the structure for other purposes.

Research agenda

Development of a research agenda for systems approach to retrofit is difficult because of the ambiguities in a systems definition. Nevertheless, a useful agenda was formulated. The major priority is to develop *the information and/or methodology to evaluate feasibility of retrofit,* or to identify an appropriate level of reuse potential. Tools for analysis should be developed by research and these tools will be useful not only for owners but also for agencies and for the public. Other research recommendations are supportive of the first. They include *accumulation and publicizing of case studies of successful retrofit projects.* Extract lessons from each particular case study. Closely related to historical case studies are the *prospective studies of newly-retrofitted structures.* Not enough is known about how these buildings function, and how they perform after they've been completed.

The last item of research agenda is to undertake *demonstrations of solutions* to specific problems of retrofit which recur in many projects. For example, the development of universal service networks for mechanical services. How are we going to obviate the problems we have now with the existing distribution systems? Are there any generic solutions? There have been some attempts at this, but we need many more demonstrations. We also need demonstrations of additional development of even more building systems components which can be flexibly changed.

To conclude on a positive note, we have at this conference demonstrated several useful projects involving retrofit and reuse potential. However, no one could point to a single complete retrofitted building or project (aside from Lutheran). We need such a demonstration to learn from. And that, I believe, is a research agenda item that is really important. Thank you.

Critical issue panel on project implementation*

1. Position Paper by John L. Morrow
2. Summary and Recommendation by Lawrence H. Mason, A.I.A.

* Note: Ms. Julie Herrick and Mr. Herbert Parker contributed to this panel as reactors, however separate papers were not submitted by these individuals.

Project implementation presentation

John L. Morrow
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Implementation in the context of this conference can be defined as "the process of planning, designing, and construction of physical facilities for the purpose of meeting specific operational requirements of an institution through the reuse, retrofit, reconfiguration of existing facilities." The goal of this process is to provide an effective facility at an optimal cost within an appropriate time frame. An effective facility means one that (1) meets programmatic goals, (2) its efficient to operate and maintain, and (3) has the capability of meeting future programmatic growth of operation or change.

Appropriate time frame is one where the lapsed time from the initial phase of the project to occupancy is minimized, yet each phase of the project is responsibly executed. Time is money, and wasted time adds to project cost. Wasted time translates into increased cost through inflation and construction interest, which the public eventually has to carry. Wasted time has another impact in that the patients and the community are denied the use of a facility to which they deserve prompt access.

When a project involves the reuse, retrofit, or reconfiguration of existing facilities there are special constraints that are critical to the successful implementation of that project. During the construction phase the delivery of existing health care services and the existing revenue structure must be maintained. Also, the institution's operating costs must be controlled during construction, and the construction program must be designed so as not to adversely affect any of the variables discussed above.

Institutional planning

The process of implementation begins not with the planning of a particular project but with the institutional plan, or in the absence of such a plan, its development. An institutional plan is one that delineates purpose, role, and includes a current inventory of resources: financial, human, and physical necessary to the maintenance and development of that role. The development of such a plan requires a series of steps and the provision for the maintenance of the plan once it has been developed. The responsibility for the development and maintenance of the institutional plan lies with the governing board, assisted by management, and the steps in the process are as follows:

1. *Review and definition of institutional purpose.*
   This general statement of mission is the most basic component of the institutional plan. It is the board's responsibility to articulate this key document.
2. *Review and definition of institutional role.*
   This element of the plan outlines what the institution does, seeks to do, and for whom. Such statements must be relevant to the institutional purpose, community requirements, institutional environment, and other community services providing comparable, complementary, and compatible services. The development of this statement will involve the community, the board, management and staff, assisted by appropriate consultative disciplines, particularly those in health care delivery and support services areas.
   In today's environment, community involvement means, at a minimum, an appropriate and responsible interface with the local planning body (HSA).
3. *Inventory and evaluation of institutional programs and resources.*
   This inventory is to include:
   1) the quality and quantity of current programs and supportive services as they relate to the institution's role,
   2) the quality and quantity of institutional resources to meet the current and projected programs as expressed in the role document.

   This process requires board, management, and staff participation assisted, as necessary, by special disciplines in health care delivery, and supportive areas. The resource inventory and evaluation can be substantially assisted by consulting services in finance, manpower, and facilities.
   Architectural and engineering assistance is key in the inventory and evaluation of current physical facilities, which require space, structural, and mechanical evaluation, as well as a review of those facilities against current regulatory body and code requirements.
4. *Definition of programmatic priorities and implementation recommendations.*

This final step in the development of an institutional plan will result in the definition of current programs to be abandoned, strengthened, and/or maintained, plus those that are deemed worthy of being developed along with the identification of necessary, existing, or required resources to meet the programmatic objectives.

The results of this process are as indicated, is an institutional plan which will articulate those elements previously referenced, plus a list of programmatic priorities which will give direction to the institution's future development and operation. The governing board must affirm this document and accept it as a basis for future action.

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In introducing this section, reference was made above to the advisability and necessity of not only developing a document, but also providing for its constant updating. Experience would indicate that a substantial number of institutions in the health care field engage in little or no formal long-range planning. However, there is ample evidence that this is in the process of change, not necessarily because of the inherent importance and value of such a process, but in recognition that an effective interface with local planning bodies is extremely difficult in the absence of such a program.

The reason institutional planning is at such a relatively unsophisticated level is directly related to the importance of such activity as viewed by most boards of trustees and their management staff. Health care institutions and their management can be justifiably chastised for their lack of appreciation of the benefits of the process. No institution can hope to survive in the future without it.

Project implementation

An institutional plan defines the programs to be undertaken, their objectives, and their priorities. Management should develop an organizational plan for the project implementation and its component process of planning (programming), design, and construction. That management plan will contain: (1) a definition of the project to be undertaken, (2) the budget for the project, (3) anticipated schedule including the planning (programming), design, and construction phase, and (4) an organizational design.

The design of the project organization should include (1) who is responsible for the project and the nature of those responsibilities, (2) the project organization itself, (3) who will be the participants in the various phases of the project and their roles in those phases, and (4) the delineation of the reporting and communication network. Explicit in this arrangement is the charge by the governing board of the institution to the management of the institution for the total project responsibility. The governing board shall also approve the organizational plan which documents that responsibility.

Project team

The members of the project team will be defined in the organizational plan and will be dependent upon the organizational model selected for the project. These various models will be outlined and detailed later in this paper.

The success of the project will be enhanced immeasurably by the abilities of the members of the project team, whatever its makeup, to work effectively together. The talents necessary for an effective project will often be embodied in individuals who, of their own very nature, are strong-willed and often opinionated. This will result, at times, in the existence of diametrically opposed individual views on important matters relating to the project. The ability of the project team to face these issues openly and honestly is absolutely essential for successful project completion. The management person representing the owner is the key individual in the implementation process and he must posture himself so as not to be a part of the problem but to expedite the solution.

An architect is also an important member of the project team. His selection should be based on evidence of previous experience and positive performance in the area of health care programming design and construction. Hopefully, he should have been involved in the institutional planning process as it is related to the inventory of physical facilities. That architect should evidence ability to translate the institution's programmatic needs into design documents, coupled with a particular appreciation as well as experience with the challenge of reuse, retrofit, and reconfiguration.

Additional members on the team will be determined by the scope and nature of the project as well as the nature of the organization for its execution. Members of the team will likely vary from phase to phase of the project.

The team will have many and varied responsibilities as defined in the management plan. Key responsibilities will be as follows:

1. define the necessary action steps to be taken in each phase of the process along with the schedule for their accomplishment in consonance with the original time schedule;
2. determine the participants in each phase as well as the nature and methods for their participation;
3. develop a preliminary budget for the project as well as a time frame and its continuous update throughout the process;
4. implement and coordinate the various phases to assure the maintenance of the schedule and the accomplishment of the specific objectives detailed in the plan;
5. establish a format and schedule of reports to the institutional management which will permit the timely monitoring of the project's progress and adherence to budget.

Other participants

Project team members, other than management personnel and the architect, will come from inside the institution and from outside consultants. The character and number will depend upon the nature and complexity of the project. Institutional staff participants will include representatives of the programs related to the project, as well as the support services for the facility and its programs, e.g., supply, communications, data processing, etc. Special consideration should be given to the inclusion plant services and the engineering department in view of their universal involvement in physical facilities, and particularly important in situations involving reuse, retrofit, and reconfiguration.

The role of outside participants will vary throughout the various phases of the project. Those likely to be involved in planning and design would be from the specialized areas of health care delivery appropriate to the facility program plus related support services.

Consultants involved in the design and construction phase are likely to include the following:

Construction—Knowledge and experience in the area of construction methods and materials, and management techniques is important in the design process, as well as in construction itself. This discipline is often not included in the design phase with the result that designs are not effectively conceived and ultimately poorly executed. The value of construction input in the design process is particularly important when the architect and the engineers are not familiar with the construction environment in which the facility is located. Experience in health facility construction and particularly in reuse, reconfiguration, and retrofit is extremely important, if not essential.

Estimation—Qualified, effective estimators are needed to monitor the anticipated construction cost through the design phase. Like construction expertise, a familiarity with the local construction scene is essential as well as the understanding of the implication of reuse, reconfiguration, and retrofit.

Scheduling—The participation of an individual experienced in critical path or similar scheduling techniques during design and construction can lead to the development of a "tighter" construction package and the minimization of "surprises" during construction. The value of the use of scheduling techniques in reuse, reconfiguration and retrofit is particularly obvious.

Management, in the selection of consultants, must assure itself of their commitment, interest and motivation, as well as a record of satisfactory past performance.

Project organization models. The scope of the project, its nature, the collective talents and expertise of the institutional management and staff as well as the quality of outside consultants will dictate the nature of the project organization. There are a number of accepted forms which the organization may take, each of which has varying strengths and weaknesses and varying applicability to reuse, retrofit, and reconfiguration.

Traditional. The traditional project organization consists of the owner, program consultants, the architect, and the contractor. The owner hires the architect, who, working with the program developed in cooperation with the owner and consultants, designs the facility and places it for competitive bidding, from which comes the contractor.

The process is linear and therefore generally takes the longest time to accomplish the project. Therefore, in an inflationary economy the traditional method is viewed as being less acceptable than other organizational forms. The process does allow the owner to know exactly what he is buying as the contractor works from detailed specifications and drawings. Therefore, the owner is dealing with a known quality because he does have at the completion of the bidding process a known cost for the project.

A disadvantage to the process is that ordinarily construction expertise does not impact until the bidding process has been completed and, therefore, some design defects can occur, some of which can be worked out following the bid process, but on occasions these defects cannot be remedied without major redesign which results in additional cost and delay. A further disadvantage is that the total cost is not known until the bids are taken. If estimation has not been accurate, often the total project is in jeopardy or certain portions have to be abandoned, which can be very traumatic and unnerving to all involved. This traditional method enjoys the respect and acceptance of the Federal Government and most finance authorities.

Design/build. In design/build the owner enters into an arrangement with an architect and a contractor who form together for purposes of developing a facility. Working with the owner's program they develop a preliminary design and specifications upon which they submit to the owner a single price for a complete project. Complete design and specifications are developed during the project itself.

Design/build is viewed as being advantageous by allowing a speeding up of the process by virtue of the fact that construction of the basic building can be commenced at the same time that the interior designs are being completed. Therefore, there is an advantage in being able to compact the total project time as well as reducing costs by allowing the purchasing early on of some of the major elements of construction materials

and equipment. The disadvantage is that to the extent that specifications are preliminary, the owner does not know in detail what he is actually purchasing. If the price for the project is close to the actual cost to the design/builder, the owner can likely end up with a facility that is substantially below his expectations. In the absence of detailed specifications it is a difficult situation for the owner to correct.

The major advantages of design/build are shortened time, known cost up/front and that there is participation of the contractor in the design as well as the construction phase.

A variation on this method is where the owner hires an architect to draw up the preliminary plans and
48 specifications from his program then entertains proposals and prices from a series of selected contractors out of which one is then selected to work with the architect in the completion of the process under the design/build concept.

The design/build merits are most applicable to new construction where the degree of program sophistication is limited and where the owner is familiar with the capacities, capabilities, and reputation of the architect and the contractors with whom he is dealing. The process is not generally acceptable to governmental agencies or finance authorities.

Construction management. In construction management the owner hires an architect and then enters into an agreement with a construction consultant or firm to work with the architect through the design process, and then to act for the owner as his agent in the construction phase. This latter part allows the owner to act as the general contractor and solicit bids for the various subcontracts. The construction management model provides the same benefit in terms of project time as design/build, as the CMC's participation allows the acceleration of the project through the process of awarding contracts for site work, excavation, footings, structure, etc. as their particular designs are completed. The advantage is to offset inflation as well as to give the owner authentic readings as to the realism of his budget through the process. If the project is off in budget, adjustments can be made during the remainder of the project rather than at bidding time, as would be the case in the traditional method.

A variation of the construction management approach is for the construction manager to agree to a guaranteed price at the onset with an optional provision that if the project come in under the price, the owner shares in the cost savings. Construction management supporters contend that the owner can achieve savings through the process by substitution of the CMC's fee for the profit of the general contractor as well as the elimination of certain administrative costs.

Construction acceleration—fast tracking—a construction strategy. This term applies to the process in which the construction project is broken down into a number of sequential design and construction steps which are contracted for upon the completion of their design stage rather than being held for a single bid processing.

The advantage is that in time of inflation the increase in cost of materials and labor can be softened by shortening the overall lapsed time for the project. It is generally conceived that the construction management and design/build models will facilitate this approach to construction acceleration as previously mentioned.

It should be noted, however, that if the owner and those financing the construction are willing to accept the process, that conventional or traditional models of construction organizing can provide the same alternative. The process increases the administration cost of the project by virtue of each of the separate bidding processes and calls for greater coordination on the part of the architects and owners to achieve the ultimate of an effective facility. Where used in that framework, the owner has only estimated project costs, with no guarantee that the total project budget is to be met.

Bidding. Under the traditional method of organizing construction, competitive bids are taken, the lowest price bid being ordinarily accepted. Regardless of how the process of construction is actually to be managed, there are variations on the bidding procedure which may have particular applicability to reuse, retrofit, and reconfiguration.

One variation is "cost plus." The contractor indicates to the owner that he will charge a fixed percentage of the total labor material cost for the project as a basis of determining his fee. The process requires the documentation by a system of accounting for the contractor's cost in order to determine the fee. The inherent disadvantage of cost plus is that the contractor is not at risk, and in fact, the more he spends the more he makes. This disincentive for efficiency can be obviated by agreement to limit the overall total payment under the percentage or to merely state the profit as a fixed fee.

A second bidding arrangement is to negotiate a fixed fee plus a guaranteed maximum at which point the contractor is obviously at risk. The third alternative, a variation on the second, is to negotiate a fixed fee with a guaranteed maximum, an arrangement whereby the owner shares with the contractors in the savings below the maximum price.

Summarized above are the conventional methods for organizing and executing the construction project. These processes are most applicable to new construction involving a substantial volume with a nominal number of phases under conditions where the nature, scope, and environment of the project is well defined and predictable.

The problems of reuse, retrofit, and reconfiguration are that projects are often limited in scope and are not usually well defined or predictable.

Contractors, will, of course, involve themselves in this

activity but ordinarily will cover themselves by increasing the bid to prepare for the unknown as well as to allow for accommodations to the owners in scheduling their activity, which is inherent in these projects.

One cannot conclude that conventional methods are not applicable to reuse, retrofit, or reconfiguration. Certainly where whole areas can be made available with considerable freedom to the contractor, conventional methods can be effective in bidding this type of project as well as totally new construction. In projects with limited scope, complex interfacing with existing services and facilities, conventional processes can be used through the incorporation of a special bidding strategy such as cost plus with a maximum fee or similar strategy.

As noted previously, however, in dealing with lenders, particularly the Federal Government and certain of the tax exempt finance authorities at state levels, there are rather tight restrictions on what the owner can do in terms of negotiating contracts. In some cases there may be outright prohibitions and the owner has no alternative but to accept one of the conventional processes. Experience has indicated that the private lenders are much more flexible in this regard and this is one of the key reasons for seeking financing for reuse, reconfiguration, and retrofit projects in that market.

In-house capability. Reuse, retrofit, and reconfiguration presents, as indicated above, a host of uncertainties that make the selection of an effective traditional model for project implementation a difficult, if not oftentimes impossible task. An alternative of merit is the development of in-house capability on the part of the institution to handle the reuse, retrofit, and reconfiguration project.

In considering this model it is suggested that capability be developed at two levels within the organization. The first level would be construction management capability and the second would be construction capability.

In discussing conventional models of project implementation, management involvement and responsibility has been clearly articulated as well as the participation of the architect. To develop construction management capability these individuals would be supplemented by a person qualified to carry the responsibilities for managing the construction effort similar to the role of the CM in conventional terminology.

This position would require a person with construction management, engineering, or related experience. This person may well be the head of the plant, engineering, maintenance department of the health facility at the present time or that individual could be developed to carry out that role. If not, an individual with that capability could be recruited to serve as a staff person.

Together with the management person and the architect, this individual would be on the project team responsible for the planning, design, and construction as previously delineated and would have responsibility to determine the manner in which the project was to be executed.

Depending upon the scope of the project, the team may determine to contract the total project, i.e., architectural, mechanical, electrical, or other pertinent contracts, or may determine that certain portions, if not all, could be accomplished by using the current plant, engineering staff, or through additions to that staff in numbers or in trades. It is certainly conceivable that certain projects would involve both use of in-house construction capability as well as the contracting for certain specific portions of the project.

There is nothing new about this approach to reuse, retrofit, and reconfiguration. The literature is replete with successful documentation of this approach by various institutions throughout the country. With competent management and competent personnel, the in-house approach can save substantial sums of money for the institution as well as provide the kind of flexibility one often needs to successfully complete a reuse, retrofit, and reconfiguration project.

Reuse, retrofit, and reconfiguration have been, are, and will be an important element of the health care system, as its institutions seek to optimize the use of their limited resources and will turn to the process to provide space for those programs that are needed by the communities they serve. The development of in-house capability to manage and, under certain circumstances, execute actual constructions appears to be an alternative to the conventional methodology for construction of such facilities.

Construction financing. In reuse, retrofit, and reconfiguration project, financing may come from institutional funds (reserves), grants, fund raising, short and long term borrowing.

Construction financing may be a part of long-term financing but depending upon the source of those long-term funds, may come from a separate source entirely.

Tax exempt financing usually provides for construction financing through either early sale of the bonds or, depending upon market conditions, the packaging of the total financing in separate issue to gain advantages of the long-term interest market. Authorities' attitude in this regard may vary from jurisdiction to jurisdiction and should be investigated carefully.

FHA financing is available for modernization projects and provides construction funding as a part of the financing package. In instances where interim construction financing is not available through the FHA loan, the existence of that commitment facilitates construction borrowing as the risk to the lender is minimal.

Department of Health, Education, and Welfare loan guarantee program is also applicable to approved renovation projects. The HEW loan guarantee program carries with it a 3 percent interest subsidy which is a material advantage to the fortunate institution that participates in such a program. This program, however, has not been funded by the Federal Government in recent fiscal years and future funding plans by the De-

partment at this point are not clearly known.

Conventional funding by organizations such as B. C. Zeigler and similar underwriting firms is a possibility and usually provides for construction financing as a part of the package.

Conventional markets such as insurance companies, however, do not usually provide for construction financing as a part of their program. These institutions rely on mortgage bankers to assume the responsibility to secure construction financing through local resources and then purchase the package upon completion. When an institution is required to secure financing under this method they will find that the construction financing is at a significantly higher rate than long-term financing.

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The institution's balance sheet, its earnings history are prime determinants in minds of lenders regardless of source of funds and dictates the limits of such borrowing as well as the interest rates to be charged both in the short and long term.

The financing of capital projects, particularly in an environment as uncertain as the current one, calls for broad perception of the institution's both short and long-term capital needs. While most institutions find that they do not have a large range of options to obtain the necessary funds for their needed programs, in those cases where some flexibility does exist, it is important to examine carefully the flexibility of the institution to deal with future requirements which may well be restricted by certain of the debt instruments accompanying the various financing packages.

Dealing with the spasm of financial markets requires the involvement of those knowledgeable in its idiosyncrasies. Ordinarily an institution will involve an experienced and skilled mortgage banker or consultant to assist them in evaluating their options and opportunities for financing their project. Ideally, their participation should begin at the time of the development of the institutional plan and will continue during each of the subsequent projects that relate to that plan along with the institution's financial staff.

Financing of projects involving outside sources of funds presupposes the institution's possession of the necessary approval by appropriate planning bodies for their projects. The advent of restrictions on hospital reimbursement has resulted in further skittishness in the financial market which is becoming extremely sensitive to the fiscal environment of the institution. Charges in reimbursement methods have resulted in the failure of certain financial sources to approve projects because of the latent uncertainty associated with the present reimbursement environment.

Summary

Successful project implementation depends on sound institutional and project planning. The governing board must assume the responsibility not only for the development of the institutional plan but must provide for its continued maintenance.

Implementation of a construction project must be the responsibility of institutional management, whose participation goes well beyond the selection of the architect and participation in the rituals of the process. Acceptance of the responsibility for the end product by management, including its effectiveness, cost, and timeliness is required.

Management must develop an organization to assure the success of the project. The organization of the process will vary depending on scope and nature of the undertaking. The architect is a key member of the team and may well be supplemented by a host of other disciplines in addition to the institutional participants. A variety of project organization models may be applicable, each, however, has limitations as well as strengths. Reuse, retrofit, and reconfiguration complicates the process.

The development of in-house capability for project management and construction provides a worthwhile alternative to the more conventional strategies.

Construction financing will be tied to long-term financing package. Careful evaluation of financing alternatives is warranted in the interest of future capital needs of the institution.

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Project implementation panel summary, findings and recommendations

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Introduction

Project Implementation proved a difficult concept to address. Constructive discussion on the subject transcended reuse, retrofit, and reconfiguration to the full spectrum of health facility construction and improvement.

One unresolved issue, which the panel discussed at length, was concerned with when the implementation process actually begins. While there was concensus that the implementation phase ends with the built or converted facility occupied and put to its intended use, there was confusion on when it starts.

Some panel members believed it started early, when the project is first conceived by the health care provider. Certainly in an age when virtually all health facility construction must obtain public approval, one can say that the first step in implementation is the institutional planning and documentation necessary for achieving that approval.

John L. Morrow, in presenting his paper, endorsed this approach. He maintained that successful implementation initially requires four tasks completed by the institution before approvals can be granted and that these tasks indirectly become part of the implementation process. He identified these tasks as: (1) review and definition of institutional purpose, (2) review and definition of institutional role, (3) inventory and evaluation of institutional programs and resources, (4) definition of programmatic priorities with recommendation for implementation. Other panel members, however, disagreed. They regarded the preparatory needs analysis and feasibility effort as a clear, separate and independent prerequisite to the project's actual implementation. They maintained that the project is not a real one, hence cannot be implemented, until it is recognized (approved) and socially sanctioned. In this regard consumer input is required.

The panel, nevertheless, agreed for the purpose of its conference mission to assume that project implementation began on or about the time of Certificate-of-Need approval. Only with this premise could the balance of the agenda be given the time required for review and discussion.

Panel presentation and discussion

The Moderator posed four questions to set the tone of the panel discussion. They were:

1. Given the decision to preserve a facility rather than replace it, necessary improvements will involve renovations; what is the impact on maintaining service and revenue and on controlling operating costs during the life of the improvement project?
2. What special challenges does the implementation team face in the planning and execution of the project?
3. Stated differently, what makes reuse of existing facilities different from construction of new ones for the hospital as the user, for the architect as the designer, and for the contractor as the builder?
4. What are the roles and responsibilities of administration, the planner, and the builder in seeing to it that an existing plant can be reconfigured functionally on time and within budget?

Mr. Morrow tackled these questions by first assigning responsibility for managing the implementation process, and he placed it with the institution's governing board. It is only the board, he felt, that can develop the institutional plan; therefore, it is the board's responsibility to maintain it. The reason institutional planning is at such

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* Editor's note: Significant differences exist between the pragmatic role of H.S.A.'s as reactors to project proposals, and the role intended in P.L. 93-641 as active participants in project development. The following is an excerpt from the Proposed Rules published in the *Federal Register*, Vol. 43, No. 90—Tuesday, May 9, 1978.

"In addition to reviews of completed applications, the Congress intended the H.S.A.'s to assist in the early development of applications."

With the H.S.A.'s intended role as project advocate, and potentially as the initiator of project planning, it is less acceptable to delineate Certificate-of-Need approval as the beginning of project implementation. Certificate-of-Need decisions represent an important GO-NO GO point in the project development process. If planning is more than simply collecting data, investigating problems and writing reports; if, in fact, planning includes the administration of "the plans"; then implementation must be viewed as the ultimate objective and critical step in an ongoing planning process.

an unsophisticated level, he said, is that most trustees and their management staff do not view it as important. Health care institutions can be justifiably chastised for their lack of appreciation of the process. No institution can hope to survive in the future without it.

When a project involves reuse, retrofit, and reconfiguration there are special constraints that become part of the process. These must be considered in the implementation stage. They are maintenance of service, maintenance of revenue, and control of operating costs of the institution during the construction. The governing board should delegate the fulfillment of these requirements to its management staff.

Management then, Mr. Morrow continued, must develop an organization to assure ultimate project success. Management must designate and define project team responsibilities and the reporting and communication network in the various phases of the project.

Julie Thomas reacted to Mr. Morrow's outline by defining the phases she considered essential in project implementation. She identified five phases. The first phase covers the development of an institutional long-range plan and the definition of specific projects to be undertaken. The second phase involves preparation of functional and space programs for each project. The third and fourth phases go on in parallel. The third phase is the design and construction growing out of each program, while the fourth phase, which goes on at the same time, she calls organizational planning. The last phase is the commissioning or occupying of each new or rebuilt facility.

Regarding the roles of the team members, Mr. Morrow said that the organization of the process will vary depending on scope and nature of the undertaking. The architect is a key member of the team and may well be supplemented by a host of other disciplines in addition to the institutional participants. Other disciplines may include construction expertise, cost estimation and time scheduling.

Ms. Thomas agreed that the planning expertise needed during each phase of a project will indeed vary. She maintained, however, that a consultant usually does not have the necessary breadth and depth of experience and knowledge of the institution to carry the project from start to finish. Throughout all phases of the project the intimate and on-going involvement of the day-to-day operating staff is essential if the project is to be successful. And, she believes, this involvement is best controlled and coordinated by a planner on the staff of the institution.

The role of the planner at any stage, Ms. Thomas continued, is to outline what has to be done and to get the right people to make the right decisions or do the right things at the right time. The planner should serve as the organizer, the coordinator, the facilitator and the expediter, but not as the decision maker. In other words, the staff planner should not *do* the planning, but rather the staff planner should *see* to it that the planning gets done.

Reuse projects, in particular, call for a planner with intimate knowledge of how the institution functions and who should be involved. This is the only way to successfully handle the detailed and complicated issues of phasing and scheduling, with the smooth integration of the project into the on-going operation of the institution.

Regarding the actual building phase, Mr. Morrow noted that a variety of contractual models is available; however, each has limitations which influence application reuse, retrofit, and reconfiguration projects. Mr. Morrow identified the several methods, and Herbert Parker reacted by explaining their strengths and limitations:

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1. Traditional, where the owner first retains an architect to design the project and then the contractor to build it. This method implies a sequential path of assignments in which program leads to design, which leads to construction documents, which lead to construction. Generally, unrealistic completion times for each stage imposed by the Certificate-of-Need process can hamper this otherwise logical method. If the project is a large one, it may be difficult to complete plans and specifications on time to bid and award the contract within the time constraints.

Mr. Parker added that split-bidding by trades, as required by many state laws, complicates a timely bidding period. However, he felt that the major limitations of the traditional method for reuse, retrofit, and reconfiguration assignments rest with the unknown conditions within the existing structure and the complex phasing required to maintain hospital operations during construction. Consequently, it is difficult for the architect to estimate accurate budgets. In his experience, Mr. Parker confessed that the spread between high and low bids on renovation work indicates that experienced contractors, too, have difficulty.

Should the timing and cost issues be met, nevertheless, it was agreed that the traditional method best assures the owner of receiving the end product he seeks because the drawings are completed and approved before construction begins.

2. Design-build, where the owner retains a contractor/architect consortium to design and construct the facility. Mr. Parker dismissed this option as virtually impossible for successful reuse results. Public bidding rules, government funding requirements, and mortgage guarantee regulations are but three of the many constraints. On private work, totally funded through non-public money, there is no legal obstacle prohibiting design-build. The complexities of reuse, retrofit, and reconfiguration, however, preclude competition which is desired in a limited market as exists today.

3. Construction management, where the owner hires two professional services—design from an architect, and cost and scheduling counsel from a construction manager. Mr. Parker noted that Construction Management (C-M) is a method accepted by most federal and state agencies for use on complex jobs. Based on his experience, he admitted to bias in favor of Construction Management for complex hospital projects, particularly those involving retrofit.

There are various types of C-M contracts. The model most suited to reuse projects requires: (1) C-M selection at almost the same time as the architect; (2) a separately stated C-M fee for the design phase; (3) a lump sum C-M fee for the construction phase; (4) establishment of a guaranteed maximum price when plans and specifications are 70 percent complete, and (5) the C-M to be fully bonded.

For a hospital retrofit project C-M has three advantages: starting with a conceptual estimate based on the hospital's written program, the C-M can continually update the budget as the drawings progress; as a member of the project team with owner and architect the C-M can contribute construction guidance in planning detailed phasing and time sequence planning; the C-M can provide budget information required for making decisions on alternate materials, systems, and procedures; finally, the C-M method has the built-in ability fast-track critical work packages once the guaranteed maximum price is set.

4. Do-it-yourself, where the owner developed in-house capability for project management and construction. Mr. Parker felt that this approach can cost the hospital more money in salary than it saves, because the hospital is obligated to keep the staff busy. If considered, it should be limited to projects of small scope. An example of successful in-house work that he had observed was the cutting and patching repairs associated with single-discipline patching repairs associated with single-discipline projects such as upgrading electrical services.

Policy

1. Certificate-of-need application requirements appear to vary from State to State; however, they do seem consistent in requiring too much information too soon, hence requiring the hospital to spend large sums of money that may be wasted should the application be denied. The problem is compounded in reuse projects.

It is recommended that policy be established first, that affords hospitals reasonable time to prepare justifications for their certificate-of-need requests; second, reimburses the institution for expenses incurred in that preparation process, and third, upon successful certification, grant the institution a reasonable period of time, matched to the size of project, to complete programming and design prior to start of construction.

2. Two of many ingredients of the certificate-of-need application are budget justification and financial feasibility. With reuse, retrofit or reconfiguration, it may not always be possible to fix on a construction cost estimate prior to space planning studies. This means that the institution cannot develop a realistic budget and, in turn, the accountant cannot prepare a financial feasibility.

It is recommended that policy be established allowing for the first agency review to be conceptual only . . . without dollars assigned.

3. It is recommended that policy be established to insure that all institutions invest in an on-going planning process and in the appropriate resources to insure implementation—whether these resources be developed as in-house or purchased from the outside.

Research

1. Research is recommended to learn about the rate of growth and change in institutions, and the extent of reuse, retrofit, and reconfiguration accomplished to satisfy the need for change. Perhaps a nation-wide sample of facilities could be examined through case method research to see how they have changed over time, say, the last 30 years.

2. As the hospital begins the process of planning—whether institutional, organizational, or physical—it will require access to data for use in the planning. Research is recommended to establish what is required for reuse, retrofit, and reconfiguration. Example could range from demographic data collection, through resources inventory, e.g. equipment, to the assembly of as-built drawings for the existing plant.

3. Appropriate forms of agreement between hospital and contractor are established for new construction, but they may not be applicable in reuse, retrofit, and reconfiguration.

Research is recommended to determine appropriate models for obtaining construction expertise during preconstruction design as well as during construction itself. A variety of models should be examined, including in-house staff; informal, separate trades for small projects; per diem arrangements; construction management; and traditional.

Critical issues panel on planning strategies*

1. Position Paper by James R. Kimmey, M.D.
2. Reactions by Lowell E. Bellin, M.D., M.P.H.
   by Julia Thomas, A.I.P.
3. Summary and Recommendations by Richard Miller, A.I.A.

* Note: Mr. Jack Hornung contributed to this panel as a Reactor; however, he did not submit a separate paper.

Planning strategies and the three R's

James R. Kimmey, M.D.
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There was a time when the three "R's" referred to the basic elements of education. Clearly, in the context of this conference, we have a new three "R's" that form the basic elements for preserving "sunk costs," and the bricks and mortar those costs put in place for a health or health-related use. To the planner viewing the premises of the conference, it appears that the conference managers have fallen into the trap of Leigh-Mallory's law. As all will remember, Leigh-Mallory, when asked why he must climb Mt. Everest, responded "because it is there." There seems an implied asumption that because health institutional capacity exists it somehow must be retained in the health field through application of one of the three "R's". This is an assumption with which planners must, if not dispute, at least question. In proposing other alternatives to the three "R's" one is tempted, for alliterative purposes, to search for an "R" word that expresses another option particularly applicable in the case of older, run-down, and non-complying facilities. This exercise yields the neologism "retrostruction" or "removal". This fourth "R" would cover the situation where the most intelligent action, albeit the least popular from an individual institution's perspective, is demolition of excess capacity and its removal from the community pool of health resources.

Fortunately, perhaps, it is not the task of this panel to deal with development of alternatives for the physical facilities involved in the current community health care system, but rather with methods for analyzing the capacity of the system, cataloging it, and recommending different configurations of service delivery within the system. In addition, the organizational structure and legal framework of such planning activities is a matter commanding the attention of this panel.

In approaching the charge, the major issues for consideration are the following:

1. the legal and philosophical environment in which community facilities planning takes place;
2. the inputs to the community facilities planning system, e.g., data requirements;
3. factors influencing the ideal mix within the system over time;
4. tools available for deriving the ideal mix; and
5. tools available, or required, to foster implementation of a community-based facilities planning strategy.

Each of these topics will be developed as a basis for the panel's discussion.

Legal and philosophical environment for community facilities planning

In the health facilities planning field, the philosophical commitment to community level facilities planning preceded both legal support for the concept and a legal mandate that such planning take place. Most of the history of health planning in the United States is a history of facilities planning. Perceived success in community facilities planning bred community health planning, and despite expenditure of large amounts of words and dollars, the primary emphasis, in community health planning, has remained the health facility.

Community facilities planning, 1935-1965. The earliest examples of planning for the health field—above the level of the individual institution or organization actually delivering services—were the hospital review and planning councils which emerged in the late 1930's. In those days, institutions or organizations which proposed to undertake new services or construct new facilities financed such programs through patient fees and community fund-raising drives. In a metropolitan community with a number of institutions, each proceeding toward the future along a pathway identified internally, and based on the institution's concept of community need, the number of fund-raising drives and the impact of new programs on charges became most quickly apparent. In several metropolitan areas, the response—particularly on the part of businesses and industries which were most often expected to bear the major financial load in institutional fund-raising—was to seek a mechanism for evaluating individual institutional projects against the community's needs for health services and facilities. The organizational structure that grew from this concern, the hospital review and planning

council, was voluntary in nature, funded from private sources, and managed by the institutions and the community interests with a financial commitment to health services. They proceeded from the assumption that an external body could look at need across the larger community and provide a plan against which individual institutional projects might be judged. The judgment carried no formal or legal sanction, but an institution which failed to receive endorsement was subject to financial sanctions when they approached usual sources of contributions for major fund drives. This approach was quite successful in several metropolitan areas, and its success led to a recognition in law of community facilities planning in the form of financial support grants for the creation and operation of such councils.

These grants were first made available under Section 318 of the Public Health Service Act in the early 1960's. With the impetus of the Federal "seed money," community facilities planning bodies grew from a handful in 1960 to more than sixty by 1966. The model followed by the majority of the new agencies was similar in most respects to the earlier hospital review and planning council model. The agency was based in the voluntary sector; was controlled by institutional interests and "community leadership;" and was without formal legal sanction to support its planning recommendations. This evolutionary phase in the development of health planning in the United States was relatively short-lived. By 1966, a new evolutionary phase had been entered.

Comprehensive health planning, 1966-1974. Public Law 89-749, enacted in 1966 and put into effect in 1967, attempted to build on the perceived success of community facilities planning and to shift the focus to the broader community health arena. The 318 agencies gave way to Areawide Comprehensive Health Planning Agencies ("b" agencies) with a broadened mandate, increased Federal financial participation, and a different governance system, one which emphasized consumer majority control of the agencies. While the mandate for the new community health planning bodies was "health," the majority of their activities continued to involve planning for facilities, and many such agencies were instrumental in influencing locational decisions, as well as whether or not to build, remodel, change services, etc. Like both predecessor bodies, the Areawide Comprehensive Health Planning Agency was without legal sanction to insure the carrying out of its plans. During the six years of operation of this program, the lack of sanctions was perceived as the most serious problem standing in the way of successful facilities planning in the comprehensive health planning context. This perceived weakness contributed directly to the next evolutionary step.

Health systems planning, 1975. The National Health Planning and Resources Development Act of 1973, Public Law 93-641, incorporated structural changes in community health planning. Many features of the Areawide Comprehensive Health Planning Agency were retained in a new entity, the Health Systems Agency (HSA). The most striking difference between comprehensive health planning and health systems planning is in the sanctions created to support health systems planning agency plans and decisions. Mandatory, sanctioned certificate-of-need; appropriateness review; review of uses of Federal funds—all represent tools for the health planning agency to translate their plans into actual change in the health services delivery system.

As was the case with comprehenive health planning, the focus of health systems planning is, in theory, on the entire health system of a community. Federal policy during the initial phases of implementation, however, has continued to stress the primacy of facilities-related planning activities. The impetus for this policy flows from Federal concern with health care costs and the role of the institutional component as the major generator of cost.

Summary. There are nearly 40 years of history in the United States of a community-level health planning activity focused on the facilities component of the health care delivery system. Although the evolutionary steps which led to the establishment of health systems planning have brought about many changes in the planning agency's structure and financing, the facilities focus, either by design or by policy, has remained a primary one .One might legitimately ask, given this long history, why problems associated with facilities continue to be identified as the most serious contributors to the health care problem. The answer which comes most quickly to mind is that the historical lack of sanction has prevented community health planning from achieving appreciable impact on the location of facilities, the type and extent of services offered, and bed capacity. Certainly, inability to secure compliance with community plans has been a problem, as much from a lack of institutional cooperation as from lack of sanctions. The former has brought the latter. Certainly, the capacity to influence institutional decisions through legal sanctions presents the opportunity to achieve compliance with plans. It also places a heavy responsibility on the planning agency to prepare adequate plans. Planning is, by its nature, a process with an element of chance. Changes in technology, taste, transportation, financing—all can make plans, and the decisions based upon the plans, obsolete. Perhaps the most relevant example is the early emphasis under the Hill-Burton planning program on creation of small rural hospitals. The hospitals promoted and supported as necessary under plans 25 years ago are now a major problem for planners who question their quality and efficiency in 1978 terms. There is a lesson in that experience for planners—who must both anticipate technology and project need—and for designers of facilities—who must value flexibility in use more highly than has been the case in the past.

Inputs to the community facilities planning system

In the simplest of terms, implementation of a community facilities planning program requires information on community need and information on community resources. As a minimum, the need component must deal with current and projected need, and the resources component must deal with static and dynamic information.

Determining the need. Donabedian has defined health needs in terms of "states of health or illness viewed by the client, or the physician, or both, as likely to make demands on the medical care system. Need is defined, therefore, in terms of phenomena that require medical care services. It is important to emphasize that these phenomena are broader than illness and include situations in which there is need for prevention or health promotion . . ." Without a grasp of the need for health services in a community, it is impossible to adequately plan the system required to deliver such services in the most efficient, cost effective, high quality, acceptable manner.

Traditionally, facilities planning has been demand based rather than need based. The Hill-Burton approach, which was utilized for many years in all areas of the country, equated the need for institutional capacity with current demand for that capacity within a community. This approach is self-defeating from a planning perspective. It accepts the existing system and the capacity within that system as the base for planning. An underlying premise in the demand based approach is that the utilization of a capacity within a system is always appropriate utilization. It tends to fuel expansionist tendencies in the system by starting from a point that is usually artificially high due to inappropriate utilization, and projecting future needs from the defective base. It is, however, a relatively easy approach to producing a "plan" for institutional facilities in a community or state. It lends itself to data collection through counting operations, such as the traditional Hill-Burton bed survey, and avoids analysis of the more uncertainty-producing elements in the system.

The philosophical basis for health planning under P.L. 93-641 is away from demand based planning and toward a planning approach based on current and projected incidence of conditions in a population which may require various types of health care services. Under this approach, the incidence of conditions within a given population is determined, aggregated, and finally converted to a service equivalent, e.g., an expression, in resource terms, of the type of health care service required to deal with the condition in that specific population. The last step, conversion to service equivalents, is essential if the information on need is to be useful in determining the desirable service capacity of the system.

There are data and methodological deficiencies in the current system which limit the applicability of a need based planning approach. These include incomplete data on the incidence of many conditions; inaccessibility of data collected by some potential sources; lack of standardized classifications of conditions which would permit aggregation of incidence data to a useful level; and insufficient information on the expected service requirements for a given condition or group of conditions.

These problems all stand in the way of a current estimate of need at the community/health service area level. The problems are compounded when the planner attempts to forecast changing need over time. Yet, it is essential that the planner do so, since decisions made at one point in time have long range implications for the mix of facilities and services in the community's health care delivery system.

Determination of systemic capacity. Data availability and analysis is also a problem for the planning agency's efforts to determine current resource capacity as a basis for planning.

Determination of static capacity—that is, a counting of the beds, equipment, services, etc. in the area—would seem to be a relatively simple procedure. In point of fact, it is complicated by differing definitions of "a bed," or "a service." In many states, an institution may have more than one "bed capacity." The actual number of beds in service, and utilized, may differ from the bed capacity as determined by an on-site survey, and in some states the licensed capacity is different from both. From an institution's perspective, the fact that space and equipment is dedicated to "providing a service" is seen as demonstrating that the institution does provide the service while, from a planning perspective, the level of service provided may be too low to justify its being counted as a community resource.

Dynamic measures of resource capacity include data on admissions, discharges, patient days, service levels, utilization rates, etc. The problem of definitions here has been most recently pointed up by the arguments between the Department of Health, Education, and Welfare and the manufacturers of CT scanners concerning the definition of the term "diagnostic procedure" as it is used in the national guidelines standard on CT scanning.

It has been often stated there is a great sufficiency of data available concerning both the static and dynamic aspects of resource capacity. Among the relevant data sets are those collected and maintained by the Professional Activity Study (PAS); the Hospital Administrative Services program (HAS); the Cooperative Health Statistics System (CHSS); the National Center for Health Statistics (NCHS); the AHA facility inventory; and Hill-Burton Facility surveys. From a planning agency perspective, the problem is not so much whether the data is collected by somebody but rather whether the data is available in a useful form permitting integration and analysis of the type required for planning purposes. Clearly, freedom of access to a broad spectrum of exist-

ing data is the prime requirement for developing an effective facilities planning capability within the HSA.

Not all data required is routinely collected, however. A second issue yet to be resolved is whether the individual HSA or the State should assume responsibility for collection of such additional information.

Assuming that the data access problems are overcome, the question remains as to the approach that an HSA should take in determining regional needs and regional resources, and establishing them as a base for decision-making on the configuration of the region's health care delivery system.

One approach would be a "pooling" approach to both need and resources. Under this approach, the region would be viewed as a whole, and overall need and resource figures derived which would become the basis for allocative decisions.

On the need side, this approach is unacceptable because it fails to deal with variations in need among population subgroups within a complex geographic area. As a minimum, the variations in incidence of disease among demographic subgroups in the area population must be separately identified and converted to resource equivalents. The variations among subgroups (e.g., the aging population, racial minorities, poverty populations) in terms of unmet health needs is so great that an averaging process could markedly distort both short-term and long-range planning decisions. Misallocation of resources based on an averaging approach to need determination could actually worsen overall health status in a community over time.

On the resource side, a straight pooling approach fails to adequately reflect time/distance factors, population distribution, and other characteristics of the area which are highly significant in distributing resources for maximum effectiveness. Note that the emphasis here is not on current location of resources but rather on population, transportation, and other factors which should affect location and distribution of resources.

The preceding suggests that an important step in a planning process designed to make the delivery system for an area more rational in terms of availability, accessibility, acceptability, cost, quality, and continuity should first look at the ideal effective distribution of resources to meet the needs of the population and its subgroups, and then look at the existing distribution for degree of "fit" and obvious situations of "misfit."

The "fit-misfit" approach has important implications for the three "R's" theme of this conference. The historical tendency in the case of "non-complying" beds has been to invest the resources to bring them to compliance on the assumption that they are needed and are located where the need is greatest. In a situation of limited resources, projects which correct structural deficiencies in order to achieve complying bed status are often given a high priority, which the "fit-misfit" approach might suggest is misplaced. Non-complying beds in an area where they are not needed should be prime candidates for reuse or "removal" rather than retrofit—the traditional answer.

Factors influencing the ideal mix in the system over time

A number of factors which impact directly or indirectly on the health care delivery system alter the appropriate facilities mix over time. Although these factors can be considered in calculations and projections concerning alternate features for the system, some, such as technological change, cannot be predicted very accurately. Health planning agencies, and institutions which provide services in the system, need to consider such factors to the extent possible in their planning and, more importantly, build both conceptual and physical flexibility into their plans and programs. This will allow adaptive change at minimum cost both in terms of the investment in the plan and in the facility.

Technological change and the technological imperative which characterizes American medical care is probably the most significant of the factors influencing service mix. The rapidity with which technological innovations achieve acceptance, and the high cost of most such innovations, emphasize their importance as factors in systemic change. Everybody's favorite technological whipping boy, the CT scanner is an excellent case in point. In less than five years, this innovative diagnostic tool has gone from the laboratory bench to the community hospital. Another example is coronary bypass surgery, which has gained great prominence in a relatively short time. Both of these examples are extremely expensive, and both have been widely accepted, in both the medical and lay communities, without carefully documented scientific studies of efficacy and cost-effectiveness. This is the "technological imperative" which suggests that if it can be done, and may be helpful, it should be done, cost not withstanding. Five years ago, the most astute planner, with the most up-to-date data and information, could not have predicted how rapidly CT scanner technology would spread. Yet, that technology has become a major consumer of the planner's and the system's resources in that time span. Even if planners had correctly predicted the emergence of the technology and its rapid applicability, what institution would have been willing to forego acquisition of its conventional neuro-radiology equipment against the planner's prediction that a revolutionary technique was immediately over the horizon?

It is often stated that planning linked to regulation can be a powerful inhibitor of technological advance in the health field. There is little question but what a planning-regulatory link might be used to inhibit the rate of introduction of the new technology while efficacy studies are being undertaken and sufficient data for informed judgment accumulated. Proponents of CT scanning would point out that an enforced delay would have led to needless invasive radiological procedures and excessive radiation to the gene pool during efficacy testing

of a device that has proven itself in practice. There are other cases, however, in which rapidly advancing technology, has been introduced without testing and has not proven itself. The popularity of gastric freezing as a cure for ulcer is a case in point. This procedure, introduced without large-scale testing and in less skilled hands than those of its developer, was rapidly discredited, and the equipment investment—although modest by CT scanner standards—written off. All this is to say that inhibiting the rate of introduction for new technology is not all bad.

A second factor affecting the ideal mix of resources within the system is population change. Various demographic sectors—such as the aged, or the economically deprived—can shift over time and bring about shifts in the health resources required to meet their special needs. The influx of a socio-economically deprived group into the population of an area would bring new demands to bear on the area's health services delivery system. The same can be true as young people leave an area to seek opportunity elsewhere, thus raising the average age of the population and the mix of conditions with which the health service delivery system must cope.

There are other factors which can induce change in the demand for health services, rather than the need for services, and thus bring pressures to alter the mix of services within a community's health care system. These include the influx of physicians in a specialty not previously represented in the area, and changes in the financing system which place an emphasis on one or another delivery setting. The history of health planning is replete with examples of the former, as when a cardiovascular surgeon locates in a community and demands facilities to practice his specialty. These demands, of course, are always based on the "need" for such surgery within the community. The effect of financing on the service mix is well known, with the most common example being the emphasis on inpatient services that grew up around the traditional health insurance mechanism.

The preceding examples illustrate only a few of the factors which must be considered in the planning process if the goal of the process is a regional system of integrated services designed to meet the need for health services, rather than the demand for services.

Tools available for deriving the ideal mix

Under P.L. 93-641 planners have been given a set of parameters for defining the services offered in a health care system, the settings in which such services can be offered, and the characteristics of the services. The elements of this taxonomy can be used to construct a three dimensional matrix, with each cell defined by one service, one setting, and one characteristic. In theory at least, this matrix would provide a method for identifying alternative delivery systems that might meet the health needs of a community. The taxonomy, which is familiar to most health planners is listed in Figure 1. If one utilizes the taxonomy to define potential cells, it is quickly apparent that there are some "empty sets" because two of the terms in a combination are self-cancelling. Examples would include the series of cells which include Community Health Protection and Promotion, and long-stay setting, or those including Habilitation and Rehabilitation, and free-standing support setting. A second constraint on this type of exercise is the degree to which a given combination is realistic in terms of proven technical and organizational structures, or these can be reasonably anticipated to develop in the future. It would be hard to envision cardiac surgery (Diagnosis and Treatment) in a van (Mobile Setting)!

Figure 1. taxonomic elements for health planning

Services	*Settings*	*Characteristics*
Community health protection and promotion	Community setting	Cost
Prevention and detection	Home setting	Availability
Diagnosis and treatment	Mobile setting	Accessibility
Habilitation and rehabilitation	Ambulatory setting	Continuity
Maintenance	Short-stay setting	Acceptability
Support	Long-stay setting Free-standing support setting	Quality

Each possible configuration of the three variables should at least be considered. The elements of the system "in place" can be identified with one or more sets of terms, giving the planner a view of the existing approaches in a format which promotes consideration of alternative views. Costs for each alternative can be developed, not only in terms of dollars, but also in terms of personnel and other resources. The project benefits of an alternative configuration is somewhat problematical in the health field, but some broadly defined benefit estimates can be developed. The evaluation of alternative configurations should include both quantitative and non-quantitative factors. Since different configurations will have different sets of virtues, the final selection will also depend on subjective criteria.

Having identified the systemic structure which would meet the health care needs of the community, the next step is to compare the resource needs (funds, manpower, facilities) with the resources already available—another "fit-misfit" situation. In this process, the planner needs to identify the existing resources that are consistent with the resources required under the desired configuration and the new resources which will be required either through acquisition, construction, or by planned change within existing elements of the community's health system. It is at this point in the process that the alternatives

of reuse, retrofit, and reconfiguration come into play as a part of the planning process. Conversion of existing facilities or parts of facilities from a use which is out of phase with community need, to another use which "fits" within the desired configuration should become a "recommended action" in the area's health plan.

Tools for influencing change

The tools for influencing change were discussed earlier in relation to the evolving community facilities planning process. These tools can be summarized as follows:

1. Tools of persuasion—Persuasive approaches encompass a variety of specific activities which do not involve sanctions. Included are moral suasion, creation of public pressure, negotiation, technical assistance, and "jaw-boning." All of these have been and are used by planning agencies in various situations to attempt to secure provider compliance.
2. Tools of coercion—The tools of coercion include all of the increasingly familiar regulatory devices such as licensure, rate regulation, and certification of need as well as concepts that have been discussed but not yet applied such as periodic recertification of the need for facilities.

Legislative enactment of tools of coercion does not eliminate the need for, or the effectiveness of, tools of persuasion. To bring about real change in the configuration of the health care system, the abstract threat of the coercive tool can strengthen and make more effective the tools of persuasion.

Tools of persuasion. Public Law 93-641 is frequently seen as a straight regulatory approach, utilizing tools of coercion. This is far from an accurate perception. The various agencies created under the Act have a variety of persuasive techniques for bringing about change in the health care delivery system in their communities. These include the planning process itself, technical assistance to applicants, development of projects, the area health services development fund, and appropriateness review.

The plan development process undertaken by the agencies created under P.L. 93-641 is central to all other agency functions. Without reviewing all the elements of the process, it should be noted that the determination of needs, the establishment of goals and objectives, and the development of recommended actions and resource requirements constitutes a process which is influenced by and can influence the configuration of the delivery system in the health service area. The very existence of a plan which specifies a desirable configuration for the health system will influence the decisions of institutions in framing their own long-range plans. This, of course, was the theory behind the comprehensive health planning process which preceded P.L. 93-641. Although additional tools (discussed below) have been made available to secure implementation, the "exemplar" role of the plan remains an important formal tool for influencing change.

A second persuasive tool available to the health planning and development agency is the provision of technical assistance. Each such agency is required to develop a program for providing such assistance to applicants for programs subject to review. Experience with both certificate-of-need and Section 1122 capital expenditure review programs has demonstrated that pre-application consultation and the provision of assistance by the planning agency is a more important tool than the actual review in preventing unnecessary capital expenditures and in shaping proposed projects to better fit community need. This persuasive tool, although ultimately grounded in the coercive tool of review, is becoming increasingly more significant.

A third tool of persuasion available to the health planning and development agency is the development of specific plans and projects which support the agency's HSP and AIP. Under this required activity, the planning agency can, of its own accord, develop the broad outlines of a program for achieving the desired structure for the health care delivery system of the community served, and suggest specific projects which would support development of that structure.

The area health services development fund provides another potential tool for shaping the health care delivery system within an area. Through selective use of small grants and contracts designed to test the feasibility of alternative delivery systems in a specific area, AHSDF grants can demonstrate efficacy and persuade providers to undertake different approaches to the provision of services that might be otherwise adopted.

Finally, appropriateness review, as currently constituted, is classified here as a tool of persuasion. Under the current legislative language, appropriateness review must be carried out, but the results are simply "made public." There is no coercive authority attached to appropriateness review, and any changes that come about in the configuration of the system following a finding of inappropriateness must be achieved voluntarily. This situation would change markedly, of course, were appropriateness review to be sanctioned, either by a state or through Federal action.

Tools of coercion. The tools of coercion available to health planning and development agencies under P.L. 93-641 are sanctioned certification of need and rate review. The latter is available only on a demonstration basis to a limited number of states, and thus certificate-of-need is the most common coercive tool. The elements of certificate-of-need are generally well understood. The goal of such programs is to control capital investment, both to limit the impact of such investment on institutional charges and to limit the operating costs (by far the larger element) of new capacity once it is in place. Certificate-of-need has limitations as a tool for influenc-

ing the overall configuration of the health care system in an area. These include:

- It is a reactive program that deals only with expansion or change in the capacity of the system and not with the overall configuration of the system itself.
- To the extent that classes of providers are excluded from certification requirements, capital is deflected from inpatient beds to other settings where it continues to generate cost in the system as a whole.
- The process is particularly prone to political interference, either from the executive branch, as in the case of New York obstetrical services, or the legislative branch, as in the case of Massachusetts' special bills granting certificates.

The foregoing discussion suggests both a role, and some alternative methodologies, for planning agencies in changing the configuration of the health system in a geographic area. Planners, however, are left with a number of unanswered questions, problems, and concerns when viewing the future of community facilities and the usefulness of the four "R's" as recommended actions in a planning context. These unanswered questions are also legitimate concerns for this panel.

Practical and political reality of reducing existing capacity

As was noted at the beginning of this paper, there is a large constituency for any existing health care institution. Included are its Board; its Administration and employees; its clientele; its physicians; and its suppliers. These legitimately interested groups form a powerful lobby supporting, as a minimum, the maintenance of the institution and, usually, its expansion. They can and do mobilize community pressures to support, or oppose change, depending on the effect that change will have on the institution. Health planning has a great deal of experience with actions which increase capacity, but relatively little experience with those which decrease capacity. The examples of mergers which decreased capacity are miniscule when viewed against the size of the duplication and excess bed problem in the United States. This lack of solid experience is a basic problem when facing the excess capacity issue. The legions of supporters face the planner and cry "show us the proof that closing out (beds, services, hospitals) will affect cost," and the planner has relatively little to show. Social and political support for maintaining and expanding a capacity is very strong at the community level. At this point, support for decreasing capacity is strong only at the more abstract national level. Even this commitment is largely rhetorical. If anyone doubts that the national government still does not have the intestinal fortitude to force the issue, one only needs to look to the proposals for a "voluntary" cost containment program or for "voluntary" capacity reduction programs, both of which are embodied in current legislative proposals.

The role of reuse, retrofit and reconfiguration

The three "R's" have potential attractiveness to planners as tools for systemic improvement. They also carry with them the problem that one man's retrofit is another's excess CT scanner. Retrofit is particularly suspect to the planner because it provides a certain amount of pressure to bring existing capacity up to standards without examining the need for that capacity. Reconfiguration, on the other hand, is quite popular with planners as a means for shifting away from expensive modalities to less expensive modalities of equal effectiveness, as in the shift from inpatient to ambulatory modes of delivery for many types of services. Finally, reuse, to the extent it removes capacity from the health care delivery system into other uses can be helpful to the planner in dealing with the excess capacity problem. If reuse can shift capacity from an area of excess to one where there is demonstrable need—as from acute hospital beds to long-term care, the results are particularly beneficial from a planning perspective, since two problems are dealt with simultaneously.

Questions for the panel. Against all of this background there remain several questions. The panel might effectively address itself to:

- What are the barriers to acquisition of the data necessary to develop plans for the health system of a community and how can these be overcome?
- What mechanisms are available (and proved) which could support development of an ideal configuration model for facilities resources in a community?
- Which of the tools of persuasion and coercion are likely to be most effective in directing the configuration of facilities resources toward the ideal?
- What are the major barriers to achieving reconfiguration and how can they be overcome?
- What are the potential roles of reuse, reconfiguration, and retrofit as recommended actions in achieving change in an area's health care delivery system?
- What changes are necessary in financing mechanisms and sanctions in order to promote use of alternatives to the status quo system in a community?

Reaction to planning strategies and the three R's

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For clarity of presentation I shall quote excerpts from Jim Kimmey's thoughtful paper and shall add my comments sequentially.

1. "There seems an implied assumption that, because health institutional capacity exists, it somehow must be retained in the health field."

Comment:
The remark is well taken. From a holistic point of view it would be optimal to transmute the facility into something most useful socially. If this turns out to be a health facility, splendid! On the other hand, if this new facility, in a modified building, turns out to be a post office or a school, again spendid! Or, at least, that's what we're supposed to say. If we were utterly objective and were devoid of professional allegiances, we ought to wax enthusiastic, no matter what decision is arrived at . . . so long as society benefits to a maximal degree.

But, one must acknowledge the proprietary attitude of any discipline with respect to a piece of real estate and with respect to specific programs. The field of health derives chauvinistic comfort from the fact that when an acute hospital is closed down, the building may achieve a new health incarnation as a long-term care facility.

But, whether the community will choose a new post office or a long-term care facility will depend on how the community perceives its needs and translates this perception of these needs into the political process. I'm acquainted with no social calculus that can mathematically score this or that potential decision.

2. "During the six years of operation of this program (Public Law 89–7491 enacted in 1966 and put into effect in 1967) the lack of sanctions was perceived as the most serious problem standing in the way of successful community facilities planning in the comprehensive health planning context."

Comment:
Let me dodge the semantics of whether planning encompasses regulation.

In this imperfect would it is appetite that moves people, and it is appetite that moves institutions, including health people and health institutions. Incentives and disincentives are primarily monetary and appeal typically to the less noble instincts of people, and of institutions.

If people and institutions routinely did what was "right"—assuming we could collectively agree as to what is "right"—we would not need sanctions. But the real world is otherwise. Moral suasion alone is inadequate to move people or institutions for very long. Periodically, the most effective moral suasion must be reinforced by application of penalty or by presentation of reward. Whence the penalty or reward originates determines whether we define it as a sanction. Many reasons might be advanced why CHP proved to be so scandalously inadequate. Certainly, a key etiological factor was the lamentable fact that CHP negotiated from impotence rather than from power, while people and institutions often treated CHP with amused disdain. I currently am unpersuaded that HSA is more than an evolutionary micro-increment over its predecessor. HSA continues to be reactive. It shares the bad genetic traits of CHP.

3. "The most striking difference between comprehensive health planning (CHP) and health systems planning is in the sanctions created to support health systems planning agency plans and decisions."

Comment:
To be sure the Health Systems Agencies (HSA) legislation has provided some teeth, but whether there is any bite to the law on a day to day basis depends on whether the State agency supports the local HSA or overrides the local HSA, when appropriate for the specific action. The locals are still advisory only, and everybody knows this dirty little secret. So the institution knows there's always a chance that it can go to the State level and reverse the adverse decision which is advisory only. In short, sanctions can be applied only if the State consents to the application of sanctions. An inventory of the cases the State has subjected to second guessing would be instructive.

4. "(The demand based approach) tends to find expansionist tendencies in the system by starting from a point that is usually artificially high due to inappropriate utilization, and projecting future needs from the defective base."

Comment:
The analysis is correct. And what is to substitute for this

traditional method of forecasting? Let us consider the next excerpt.

5. ". . . the incidence of *conditions* within the population of the area under study is determined, aggregated, and finally converted to a service equivalent, e.g. an expression, in resource terms, of the type of health care service required to deal with the condition in the specific population."

Comment:

There is a mathematical tidiness of this approach which is quite appealing. The question is what "conditions" do we choose to aggregate and convert? The planner as data collector makes a contribution here, but the political process takes over immediately. There are simply too many conditions and no multi-faceted program can handle them all. As I've said before, the political process translates perceived need into demand by would be consumers who now bargain for more of the pie. My experience has taught me that demand is here to stay, and that demand remains and always will remain paramount. Need is a favorite abstraction of health planners, but economists know better. They play with demand curves—not need curves. If we were to construct need curves and were to take them seriously, we'd bankrupt the tax payer.

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6. "There are data and methodological deficiencies in the current system which limit the applicability of a need-based planning approach. These include incomplete data on incidence of many conditions; inaccessibility of data collected by some potential sources; . . ."

Comment:

True, but the opposite is also true. We are drowning in decades of underutilized and unutilized data. You see it's always safer politically to collect data than do something with the data already filed away in the archives. If patriotism, as Samuel Johnson said, is the last refuge of the scoundrel, cries for more and more data can be refuge of the passive.

7. ". . . inhibition in the rate of introduction of new technology is not all bad."

Comment:

True. Nothing is all bad. Long before Hill-Burton, CHP, RMP, and HSA the scientific method demanded statistically defendable testing. The alternative, after all, was quackery that could imperil the well being of the patient.

I think we ought to retire CAT scanners as a pedagogic tool. My students and I are getting titred of it, and would like a newer villain.

It takes enormous self-assurance to hold back a tool whose efficacy has been reasonably proven as a substitute for dangerous procedures. I realize that I am uttering revisionist heresy. But let me call your attention to the phenomenon in New York City where radiologists in private practice bless HSA and light votive candles for its continuing success. You see radiologists and neurosurgeons—who are out of jurisdictional range of HSA—can and do buy CAT scanners. They are making the proverbial bundle, while hospitals, their natural competitors, are forbidden by HSA to buy the devices.

Nor is this phenomenon confined to CAT scanners. My agents tell me that HSA's in some communities have inhibited the advent of surgicenters. That is, one-day ambulatory surgery, on the grounds that since inpatient surgery was already existent in town, a surgicenter would be duplicative. The hospital is thereby grandfathered in. I doubt that this is what the provers of P.L. 93–641 originally had in mind.

Final comment:

Dr. Kimmey has analyzed his topic with ingenuity and wit. My comments have derived from the modifications of such analysis which comes from application in the trenches of health planning and health administration.

Reaction to planning strategies and comments on reuse

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There was an assumption at the conference that reuse of hospital buildings makes sense in many or all situations. Implicit in this was the quoted argument that "I'm paid for, use me." Certainly, exploring new uses for existing structures can and should be a valuable aspect of planning and building evaluation. The impetus for reuse should not, however, be solely linked to the need to phase out unneeded hospitals by encouraging reuse of old buildings for other purposes. As a short term strategy to control costly duplication of services, buy-out incentives may be quite appropriate. As a long term strategy, I would argue for a new look at the expected, and desirable, practical life-span of a building.

Continuing to spend new dollars on obsolete structures may not be the most cost-effective way to meet community health and social needs. I think this is particularly true where we are dealing with a building type as use-specific as hospitals. A parallel example can be found in airport planning. Consider the countless number of airports located in inaccessible or inappropriate locations, totally inadequate to handle new generation aircraft. To continue to upgrade these airports or to reuse them for other purposes goes wholly against the grain of the surrounding neighborhoods and may not be in the interest of public safety. I think we must look beyond sentiment and inertia in evaluating reuse issues.

I would pose an alternative approach to planning hospital facilities which would create a shorter time frame for the servicing of debt. Instead of the current minimum expected life of 30–40 years (which often outlives the community need for health services which can be delivered in that setting), I would explore the benefits of shortening the period of servicing debt. This would acknowledge at the outset the temporary quality of the building and the need to respond to changes in health delivery on a continuing basis. Thus, the structure would be viewed as a short-term investment, which could either be considered as a disposable element in the hospital's landscape, or as a candidate for reuse for other non health-related purposes. Reuse could then be justified on another basis, tied to "highest and best use" analysis given the real estate value and other types of needs.

Planning strategies summary and recommendations

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At 4:30 yesterday afternoon, within an hour of the end of our last committee session, and after a sheer sense of desperation had set in at the possibility of gaining any consensus in the formulation of policy recommendations and research topics, the planning strategies panel, using a modified brain-storming technique, began two lists on the blackboard. In fact, the consensus that emerged was surprising.

This morning, hearing reports of panels that have already presented and talking to panel members whose findings will later be presented, I realized that similar findings are going to be presented all day: in effect much of the discussion could be considered redundant. I don't happen to think so. In fact, it is confirming when policy recommendations and research topics are corresponding among panels, and brought from separate points of view they take on added depth.

It is appropriate for the planning panel to make that observation, because policy and research must provide the background for planning, and in reuse, retrofit, and reconfiguration of health facilities it is planning that must come first. Indeed, it is mandated now. This was evident in the recitation of the growing power of planning by the panel's Presentor, Dr. James Kimmey.

The current structure of health planning under P.L. 93–641 starts at the local HSA (pronounced, Dr. Kimmey tells us *"Ha-SAH!"* as if one had delivered a lethal karate stroke) which passes recommendations to the SHPDA or the State Health Planning Development Agency (pronounced "shipda") which reviews recommendations to be passed along to SHCC, or the State Health Coordinating Council (in the world of government, which is a world of boggling numbers and inevitable acronyms, "shic").

This new and cumbersome world is an evolutionary development, and it was the consensus of the panel that the evolutionary process would continue.

Dr. Kimmey identified four stages in development to the present health system planning structure.

First, planning for health was initially intra-institutional. Each institution did its own planning, obtained its own funds and satisfied its own concept of need. In the beginning, at the instigation of fund-raisers, fund contributors and local level business and industry—in short the people who were expected to support capital programs—the institutions themselves organized into local Hospital Review and Planning Councils. Their auspices were voluntary, their governance was provider-oriented, their authority was limited. They had no legal ground and their scope was limited to hospitals. It is interesting to note that the "engine" of health system planning was the control of facility development, and that emphasis still remains today.

Second, Section 318 of the Health Service Code was enacted in 1961, and by 1965 some 63 agencies were created nationwide. This legislation did not change auspices, governance, authority, or scope. It only provided federal funding to replicate and encourage Planning Councils to form where they had not already been demanded.

Third, in 1967, Section 314B did create the so-called State "A" and local "B" agencies. The effect of this legislation was primarily to change the manner of governance. The net effect was that consumers became the majority constituent on boards. In other respects matters remained much the same: auspices remained generally voluntary (only 10 percent of the some 200 local agencies in being were governmental), authority was limited and their focus remained control of the hospital facility development; although according to Dr. Kimmey, a shift toward increased concern for health could be discerned.

Fourth, with the passage of Public Law 93–641 in 1974, "B" agencies became or were replaced by HSA's. The change was to a system where federal funding was given to the agencies, their authority was broadened, and their decisions must now meet judicial tests.

Two observations emerge from this history: first, health system planning is essentially in support of a political process to control costs and slow expansion; and the "engine" of this control is to control of the facility development process.

Dr. Kimmey observed that methodological deficiencies vitiated the efficacy of "need" based planning, and that consequently too much health system planning was therefore "demand" based. Since, he said, demand based determination was inherently expansionistic, the objectives of planning were being frustrated.

Another indictment of the present approach to health system planning was expressed by Reactor Dr. Lowell Bellin. Planning and regulation, he observed, are ostensibly political processes within the community; but too often regulatory authority is exercised by those "whose incentives are primarily monetary" which often results in giving way to the less noble instincts. Further, he observed, "the dirty little secret" is that in a great many decisions at the lower level—the community consensus level—were overruled at the State level.

Dr. Bellin disagreed that more data was needed, observing that we were "drowning in data" and that the first recourse of most people was to demand another study. He further observed that a truly need-determined health system would bankrupt the nation.

Reactor Ms. Julia Thomas, bringing the point of view of the architect and planner, asserted that more involvement of architects was necessary in the HSA process, especially in facing questions of reuse.

Reactor Mr. Jack Hornung, with the point-of-view of the on-the-line administrator, felt that HSA's couldn't make logical decisions on issues of total replacement versus reuse because they couldn't have all the facts in hand. Essentially he felt that the means to achieve an end should be left to the initiative of individual institutions who were more likely to resolve facility decisions as industry would—which is not afraid to replace an old plant if increased efficiency can result.

Underlying much of the discussion was a sense of frustration that the political process was often unfair and uninformed and that health system planning was essentially a process of controlling facility development, thus obscuring the real issues of health care planning.

In the development of policy recommendations and research recommendations, these two concerns were background for the statements developed at 4:30 on the blackboard and refined and restated here.

Policy recommendations

First: *alternative facility reuse, retrofit, reconfiguration, or removal analysis should be a required part of any comprehensive facility plan.* We have all observed the phenomena of piece-by-piece updating or expansion of existing facilities. The individual project is considered in and of itself, without being considered in the context of the entire institution of which it is part. The result is often a build-up of inefficiency on a chassis of antiquity. If alternatives were developed and compared in an organized way, there would be a chance for planners to select alternatives that not only solved an immediate problem or filled an immediate need, but contributed to a sensible overall strategy for facility redevelopment. The obvious is not always the best alternative, especially if the overall context is considered.

This recommendation implies a second: *comprehensive facility plans should be developed only within an environment of existing facility appraisal.* Existing facility condition, utilization, and efficiency should be recorded in the initial comprehensive facility plan and continuously updated as a condition of approval before any reuse, retrofit, reconfiguration, or removal decision is implemented.

Third, *HSA's should explore reuse alternatives for health facilities before underutilization occurs.* This would allow reuse to resolve problems of over-capacity and, at the same time, provide for unmet needs in other sectors. Needless to say, having reuse "cards up their sleeves," so-to-speak, would give HSA's a chance to prevail in reducing capacity when ordinarily the political process would never see it through.

Fourth, *integration of health facility planning and physical community planning should be mandated.* Many of the HSA contributors to our panel recognized that while reuse is a part of their concern, many potential reuses were not within their mandate; thus they would need to more closely integrate their plans with community plans. If health facilities are potentially to be reused as schools or residential facilities or commercial facilities, the HSA planners felt the need for guidance and connection with that segment of the community involved in planning for these uses. The other motivating force behind this recommendation was the sense that location was an important but neglected factor in health system planning. Criteria and standards for location are not well-developed and this could be corrected by closer links to the general field of community planning.

Fifth, in following up the initial recommendation of Dr. Kimmey that a fourth "R"—removal—should be added to three "R's" of reuse, retrofit, and reconfiguration, the panel adopted the recommendation of Ms. Thomas: *economic gain for social purposes should be a high priority in future planning.* Behind this is the quite simple notion that health facilities very often occupy prime real estate. Sale for redevelopment of that real estate could in many individual cases make more sense than continuing use in the health sector. Many impediments currently exist to returning hospital land or buildings to the tax base. These should be removed and disposition of the real estate should be a recognized alternative in reuse, retrofit, reconfiguration, or removal analysis.

Sixth, a final recommendation was: *a system of incentive payments such as is provided in pending Senate Bill 2410 to "assist and encourage the voluntary discontinuance of unneeded hospital services" should be provided by the Federal Government.*

Dr. Kimmey provided the background to this recommendation: "Under 2410, a health facility could not only die gracefully, but it could also afford a nice funeral, because 2410 would add a part G to Public Law 93-641, Title 16 of the Public Services Act." Basically this program provides financial assistance for debt payments, incentive payments and conversion payments to support just the kind of things this conference has been concerned with. The important thing is that there is

some recognition here that there ought to be financial support to stimulate institutions to look at the excess capacity problem and begin to make adjustments.

Research recommendations

First: *develop guidelines and models of appropriate reuse options.* At this point there is very little experience and less literature of reuse. The exhibition at this conference demonstrates that. What is needed is an organized investigation of the architectural, structural, and mechanical qualities of old buildings which are impediments or incentives to reuse. Some buildings are appropriate for reuse for some functions but not for others. A workbook allowing organized evaluation of existing buildings for alternative reuses in individual cases would be a very useful addition to the literature. Such a workbook could be accompanied by case studies of conversions with an evaluation of their viability in terms of efficiency, economy, and amenity.

Second: *develop standards and methodologies for need determination in areas of health services beyond the current limited determination of bed need and related diagnostic and treatment facilities in acute general hospitals.* Presently there is very little background in need determination or community demand for a wide range of reuse options: Doctor's offices, ambulatory facilities, nursing homes, alcoholic detoxification facilities and on through the whole gamut of health-related facilities. Without such standards in need determination, there is great risk that as reuse options are developed, overcapacity in these areas will replace the current over-capacity in acute hospital facilities.

Third: *develop comparative studies of new construction versus reuse.* Very little is known about the process of considering new construction or reuse as alternatives for satisfying specific facility needs. There is, quite simply, an emotional reaction against new construction. Reuse comes in many little packages and these packages may ultimately cost as much or more than appropriate new facilities. Investigation into ways of comparing each alternative in individual cases is needed so that appropriate decisions can be taken. Combined with options for reuse or disposition of health facilities outside the health sector, new construction could, in many cases, reduce capacity and increase efficiency. The alternative should be given a fair chance.

Fourth: *develop locational standards for reuse facilities.* While little is known about the geographical distribution of hospitals, less is known about the appropriate location and distribution of the wide range of reuse options identified earlier. A building may be quite appropriate for reuse in ambulatory care for example, but it may be quite inappropriately located. At this point we don't know and we are in danger of embarking on reuse when location alone would deny the viability of the project.

Fifth: *develop inter-institutional reuse strategies.* It is fundamental to the very idea of health system planning that all facilities in a community are, in effect, a "bank" to house all health system needs. If that "bank" of facilities had known and comparable characteristics it would be possible to match facilities to needs on a community-wide basis. Of course, political realities are the primary deterents to inter-institutional reuse strategies, but research into the kind of data that should be available on a community-wide basis would vastly facilitate the development of inter-institutional strategies.

I observed at the outset that control of facility development was the "engine" of health system planning. Faced now with excess acute hospital facilities, health system planning is turning to possibilities for redirecting the facility investment through the four "R's." Perhaps the most frustrating aspect of this conference has been, for me, the fact that we dwelt almost exclusively in the realm of problems and not in the area of opportunities. There are vast, unmet needs in the health system. An effective system of ambulatory care is desparately needed. Programs in mental health, alcoholic detoxification, rehabilitation, and health education are urgently needed. Housing and community facilities for the aged are still too often abysmal.

In all these areas possibilities for meeting these real social needs can be enormously assisted if the present facility resources of this country could be creatively redevoted to these new and challenging needs.

Beyond that, our cities are urgently in need of revitalization. In this regard, too, the nation's excess health facilities and the land they stand on could be recycled for new uses. It is a sad fact that many of our health institutions are at the core of decay; indeed, in some cases their inhuman and isolated qualities cause decay. Here too is opportunity in the current excess of facilities.

Increasingly, our large acute hospitals have become isolated, physically and functionally from the general environment. Intelligent application of reuse, retrofit, reconfiguration, and removal could break down that isolation and contribute to a health care system integrated ino the general context of our society.

Critical issue panel on facility evaluation criteria

1. Position Paper by Richard Sonder, A.I.A.
2. Reaction by Gary Larson, A.I.A.
3. Summary and Recommendations by J. Richard Goldstein, M.D., M. Arch.

Note: Professor James Marston Fitch and Mr. William Spence Black contributed to this panel as Reactors; however, separate papers were not submitted by these individuals.

Facility evaluation criteria presentation

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Humans do not accept their environment in "as is" condition. Only regimented social orders, like the army, manage to inhibit the impulse to change things to suit. While army recruits do not rearrange their barracks to get a cozier ambiance (they restrict their individualism to the foot locker), the rest of us find subtle ways of adapting available space to match our needs or adapting our needs to match the space. The process of reuse goes on all the time, not only in buildings covered with ivy, but also in shiny new ones. The degree of change, the quality of the imagination used, and the success in creating an improved use vary enormously. While it might be useful to examine more closely the adaptive type of reuse that goes on continuously, this conference deals with the other end of the spectrum: the formal, large-scale project that affects a whole building or at least a major portion of a building. I suspect that this type of reuse project will always be measured against proposals to create new buildings.

In the widest view, do the criteria for evaluating a reuse project differ from those applied to a new building? My answer is: *No*. In either case, the evaluation should result in positive answers to these four questions:

1. Is the project contextually appropriate?
2. Is it strategically sound?
3. Is the planning logical?
4. Is the resulting environment sensitive to human needs?

Only when we look in greater detail at these questions do we find that the methods for achieving success in recycling differ from methods employed in new projects.

We will examine the four questions one by one:

1. Is the project contextually appropriate?

Any project, new or recycled, must fit itself into a larger context: it must take into account the historical past, the present, and the future development of the institution served and its community. The appropriateness of a project must consider some basic differences between new and reuse projects.

In creating a new facility, we *add* to the pre-existing world, and it is the addition that has impact, that changes the world for better or worse. Depending on the point of view, the impact is magnified or diminished—to the distant observer, St. Paul's Cathedral was merely a "pimple on the face of England;" to the brownstone dweller, a new 30-story tower next door is a total disaster. When recycling a building, we happily do not *add* to the world, so the disruptive dangers are lessened. But, instead of adding, we *select*, and that selection can be good, indifferent, or bad. Of the available building stock, only the most appropriate building (or portion of a building) must be selected for recycling. The building thus preserved should have been a good one originally. The passage of time should not now render it into an anachronistic aberration. It would be a double sin to prolong the life of a structure that was harmful in the first place—we should know when "to pull the plug."

We must also make certain that the selection allows for a sounder investment or a superior solution at some future time. Back in the dark ages, when reuse was still called renovation and/or alteration, many institutions were permanently crippled in their development by the pragmatic recycling of old buildings. Buildings were renovated with little thought of impact on future development. The inhibiting forces that distort future growth and change most usually are:

Over-investment in an already depreciated building which unreasonably extends its life-time *on an accounting basis* beyond its life-time *on a functional basis*. For example: 1978 investment in a coronary care unit in a 30 year old building will increase the life of that building to 60 years and preclude investment in a truly satisfactory coronary care unit for another 30 years.

Placement of a critical element (an element that must serve continuously) in an existing building in such a way that its eventual replacement must occur in an unfavorable location or at a unfavorable time. For example, the eighth floor of a new building, just constructed, houses a new surgical suite. The eighth floor of the adjacent flanking building, 40 years old, is reutilized for post-operative recovery. The layout for surgery precludes eventual relocation, in new space, of post-op recovery. It will be very difficult to tear the older building down. At the same time, the re-

covery room is not up to latest standards because of the inhibiting shape of the older building.

Appropriateness in selection of the right building for reuse must address itself to the historical development of the institution and the institution's relationship to the larger community:

- An institution with a consistent growth pattern that can be translated into a consistent need for more space can afford to keep old buildings as it transfers more complex, high-technology functions to new flexible structures. In other words, it can afford to keep growing in physical size.
- An institution without such a historical pattern cannot afford to "hang on" to older structures, as the upkeep and unfettered "Parkinson's Law" use of such facilities eats into the institution's budget. In this regard, it would be most worthwhile to have some research on methods of "moth-balling" buildings that must be out of use for a foreseeable time period.
- As older buildings generally tend to lend themselves more easily to non-inpatient related use, it must be presumed that the institution that recycles older buildings has need for growth in such uses: service, office, lab, outpatient facilities, etc. But we must be careful to rid ourselves of some *a priori* assumptions that have plagued us in the past. For example, as new acute inpatient facilities are built, older buildings are often turned over to non-acute long-term inpatient use. Or a poorly configured building is expected to accommodate outpatient services. In many cases, such uses reflect value judgments that are inconsistent with the aims of the institution or with the expectations of the community. Long-term care is not secondary to acute care and may be very poorly accommodated in old buildings. Decent outpatient services may well be the top priority of the institution's service area, and use of unsuitable older buildings might place these services outside the mainstream of activity.
- And, of course, good judgment must be exercised on the symbolic, emotional, and aesthetic value of the existing building stock. While the preponderance of older hospital buildings in the country must be classified as "junk," there are the exceptions—handsome buildings, buildings that are associated with an institution's image and heritage, buildings that were financed through heroic philanthropic efforts, buildings that are part of the essential fabric of the surrounding community. Such buildings should not be discarded, but they must meet the same criteria for contextual appropriateness as any other older building: it must make good sense to reuse them.

2. Is the project strategically sound?

Implementation of a recycling project is a strategic exercise that must tackle the following questions:

- Is the type of investment clearly defined and appropriate?
- Is the project's cost appropriate in view of the gains and in comparison to new construction?
- Can the project be properly sequenced to allow undiminished services?

Investment policy must be closely attuned to the aims of the project. For a new project, such calculations can be matter of fact: a 30 year bond or mortgage can be applied to a building that, we hope, will be useful for 30 years. But in recycling existing buildings, the calculations become much more open to question. If the expected lifetime of the project is relatively short, either because the occupancy is a temporary one to be replaced by still another function or because the building is slated for demolition at a predictable date, the investment vehicle should be structured accordingly, utilizing either short-term financing or cash. Long-term debt should be applied only to reuse efforts that have appropriately long life in a building that is sufficiently upgraded to stand for 20± years.

Certain government-sponsored programs have, I'm afraid, overlooked the mismatch between expected building life and investment vehicle.

In future years when renovations undertaken to correct deficiencies and code violations will no longer be viable, the institution will still be paying interest and amortization on the debt incurred to finance construction.

In evaluating a reuse project, I would take a good look at the appropriateness of financing. Further, I would suggest that research on the methods for matching financing with projected life-time would be most helpful.

Directly related to the investment question is the examination of the relative cost of recycling in comparison to new construction. I think it is fair to assume that health facilities can generally be better accommodated in new construction than in old buildings. (Outside the health field, this may not be true. Facilities less demanding in functional parameters like housing, commercial or office space can be quite effective in old facilities. But the Ghirardelli chocolate factory, delightful for shops, boutiques, and restaurants, would not work out too well as an acute care health facility.)

If it is true that a new building will be functionally superior to a recycled one, it will be necessary for the reuse proposal to have a clear cut advantage in first cost over comparable new construction. This advantage must be sufficiently great to make up for a presumed disadvantage in operating costs. While there may be exceptions, common experience indicates that older buildings are more expensive to run than new buildings; that is,

- usually the layout is less efficient for staffing;
- older buildings require more maintenance and repair;
- energy use, if environmental conditions are to be on a par, is often higher although some older buildings do well in that respect.

Here again more accurate methods of evaluating cost comparisons between proposals for new versus recycled

space would be helpful. Research into this area could reveal that simple cost per square foot comparisons are not adequate.

Implementation strategies must take staging into consideration. Building reuse is often preceded by initial construction of new space. The new space allows decanting of functions from existing space, and this in turn allows for the redevelopment of that space for new purposes. Thus reuse is often the tail-end of the long construction sequence, and consequently it is the likely target of neglect. (Planning in detail is put off for another day; project budget is used up on new construction, leaving only the "crumbs" for the second stage, "crumbs" diminished by unexpectedly high escalation of costs; departmental units located in the reuse are sometimes less prestigious than those in the newly constructed space.) Construction sequences must often be broken into substages in order to keep the institution working at full strength with no diminution of service or income. A well planned project should allow patient services to continue undiminished in volume or quality during a recycling operation. This is particularly difficult to achieve in a retrofit project where space usage does not necessarily change. A typical example would be the upgrading of a surgical suite while the suite is in operation. The design should clearly take into account the construction sequences by wing, by floor level, by vertical section (riser by riser), etc.

The design should also reflect the type of construction forces to be used: all outside contractors; all in-house personnel; or some work by outside forces supplemented by the institution's own construction staff. The choice can influence the way a project should be sequenced and, in turn, how it should be designed.

3. Is the planning logical?

In evaluating the planning quality of a new building, it is difficult to forgive errors. After all, the designer is in control of all the forces that shape the building. In evaluating reuse, can we afford to be more lenient? ". . . After all, it's a recycling job. . . ." To some extent, the standards must be lowered, but we still hope to find the same qualities that we applaud in new buildings.

The prime question will be: Does the planning reflect a "good fit" of the program? Is the overall space allocation reasonably close to program goals? Or did the building's limitations shape the program? Do the individual spaces fit the programmatic requirements?

The answers to these questions may not be as simple as they would be in evaluating the design of a new facility. After all, we know that we can "do surgery in a tent," and that we can provide first-class patient care in a 30-bed ward. Without going to such extremes, it might be quite different in shape and size from ones that are "custom designed" in new facilities. True, codes call for operating rooms with minimum dimensions of 20′ x 18′ and patient rooms with eighty square feet per bed. But codes do not dictate everything in a health facility: offices must not necessarily be 8′ x 12′; there is no "standard shape" for a waiting room or a cafeteria. Most of us live in "found space" at home and at work; some of us appear to take good advantage, some of us make a botch of it.

In any case, new or reuse, we are suspicious of rule-of-thumb formulae that purport to measure the efficiency or effectiveness of buildings; square feet per bed, net to gross ratios, dollars per bed, etc. I would prefer to measure efficiency or cost effectiveness on a case-by-case basis, by comparing the reuse design directly with similar examples or with equivalent new facilities. So we can refine the original question about "good fit" and ask, "Does the planning take good advantage of the building's attributes?" We certainly can hope that it did not *cancel out* the attributes! We pray that vaulted ceilings remain in their full glory without being "improved" with a new 2 x 4 lay-in acoustic ceiling; that clear-cut circulation paths remain undistorted; and so on.

On the other hand, we would want the undesirable aspects of the past to be diminished: poor light, bad ventilation, unreliable plumbing, unpleasant acoustics. There can be no compromise on dangerous egress systems and unacceptable fire/smoke code problems. Nor can we live with monumental entrance steps that leave the physically handicapped out of the picture. Depending on the circumstance, control and security in old buildings must be quite as good as that planned for a new facility.

In designing the new facility, we strive for a systems approach that attacks the distribution of electro/mechanical services with an overall logic as opposed to adhoc pragmatism. We do so because we hope that such systems can continue to serve as programs change and grow. Should we apply the same criteria to a reuse project? While we can't be a thoroughgoing, there is reason to believe that giant steps will be made in this area. We are eager to see the report of the *Systems Approach Panel* on this aspect of planning. After all, reuse can go through many cycles, so change is as much a factor in recycling projects as in new projects. There are differences, however:

- The type of function accommodated in older buildings *tend* to be less demanding in need for electro/mechanical services. Thus overkill in systems approach may be possible.
- Recycled buildings are less likely to grow in size than new buildings, simply because they are not designed to accept growth.

4. Is the resulting environment sensitive to human needs?

How will users behave in the facility? Patient, staff member, visitor, each must gracefully negotiate a complex array of functions, in concert when necessary, and individually when privacy is called for. The evaluation process should mimic the design process by playing out the

role of each user, tracing the path through each adaptive activity and judging whether the experience is likely to be a happy or an unhappy one. Here the criteria do not appear to vary from those we would apply to a new building. Some basic questions that must be answered in playing out user roles:

- Can the user accomplish the tasks to be performed? Does the visitor or patient gain access easily, receive information, find his way about, wait in reassuring spaces, discuss problems in privacy, be examined/treated/bedded down in surroundings conducive to correct diagnosis, easy referral, and quickest recovery? Can he meet other visitors or patients or staff members in a climate that encourages well being?
- Can the staff member gain access easily; work in spaces conducive to concentration, attention span and effectiveness; relax in an atmosphere that will recharge his energy; meet other staff members in loci that promote the exchange of useful information and the development of camaraderie?

Does the design reflect the needs of users to identify with a particular environment or territory?

If the recycled building is part of a larger complex or campus, does the design promote integration of activity in the mainstream of the institution's overall activity? Does the user feel that the facility is an integral part of the whole?

Judgment on the aesthetic values in recycling is, of course, the most subjective of this listing of criteria. At the same time, the reaction is probably the most immediate and potent. While it is hard to classify good and bad approaches to design vocabulary, it is possible to state some simplistic rules of the game:

- If the old building has a character or style worth saving, it should be preserved in the redesign.
- Style and character can be preserved either by thoroughly carrying through the spirit of the original work, as in preservation work, or by sympathetically contrasting the contemporary new work against the original style. Halfway measures or bland evasion of the issue is fatal.
- If the old building has no character or style worth saving, the designer is free to create an entirely new character.

Conclusion

Earlier in this paper, I indicated my aversion to formulae that purport to measure efficiency or cost effectiveness. Evaluation of reused facilities for health care probably cannot be reduced to a systemized methodology. There might, however, be some good sense to developing a *checklist of areas of concern*. In fact, this paper was originally prepared in the form of a checklist.

The process can be reversed (once we have the full input of this conference), and a condensed listing can be made which could lead to some sort of scoring system. Whether such scores are meaningful remains to be seen. A better analog to facility evaluation might be found in the Michelin guide to restaurants, which sensibly awards stars, knives and forks, and so on. It might take a few years to develop a reasonable comparative system which would measure the quality of a reuse project against a universally recognized paragon. It is to be hoped that this conference will uncover such a model and will shed light on the ingredients that make a reuse project a solid success.

Reaction to facility evaluation criteria

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Evaluation/feasibility

A facility evaluation checklist should be a part of every recycling project feasibility study preceding any decision to implement design or construction activities. The evaluation of projects as "end products," in a jury situation, misses the mark. Critical issues and attitudes must be thoughtfully analyzed before undertaking any commitment to a "specific" recycle project.

A pre-project criteria list for evaluating the potential for a quality end product would help many professionals understand the complexity of the commitment to be made in two basic areas:

1. Potential of the proposal to fulfill all parts of the brief:
   - program
   - planning
   - systems
   - environment
   - urban context
2. Understanding the diverse goals for user/client satisfaction which need to be established and satisfied in the development of a project.

Design awards/finished product. Each project to be considered as an "end product" should have addressed the evaluation/feasibility issues listed above and the following issues should be distinguished from design and planning activities where the architect's skill as shaper of the environment is paramount. It would be in keeping with this logic to presume that the "reality" of the project resulted from creative "optimization" of the issues listed below.

1. Investment: Since the project is a reality, the financial proforma must have been workable.
2. Implementation: The plan should be designed to optimize construction and operational realities and requirements for continued service.
3. Cost: A proper "evaluation/feasibility" analysis would set as a prerequisite for implementation for any project that the following categories be tested:
   - Capital first cost
   - Staffing requirements/operational cost
   - Life-cycle costs

Planning, design, urban design, interior design, behavioral design, M&E systems design are issues which may adequately be considered under the broad umbrella of the "awards jury" concept. One may properly identify success criteria related to the following concerns:

1. Relating scale, environmental approach, clarity and legibility of a planning solution to the human emotional/perceptual requirements of the users (patients, staff, visitors), each group perhaps with variable and even contradictory needs.
2. Understanding the planning solution as a logistical/circulation network in the context of the specific user operational patterns and characteristics. This sensitivity is necessary to interpret the success of item 1.

Within this broad area of concerns, the basic "success" of a project should have been guaranteed by the proper assessment of project potential. The final nuances of "success" should properly be the product of the designer's skill and commitment to understanding and satisfying project goals which must be established for environmental quality and suitability to the user needs.

Main point. I have suggested that an evaluation criteria checklist for finished architectural projects in an awards setting is incomplete unless there was a previously established set of goals for the project which the design effort and construction sequence were to have satisfied. Such goals can only be established after a feasibility effort is completed which examines project potential, based on a set of evaluation criteria. Ideally, the finished product should be evidence of "success" in the areas of finance, implementation, and cost since the project should be the result of an "optimization/benefit" process in the feasibility stage.

Evaluation criteria should be contextually oriented in health care design. The outcome of this attitude is the need for understanding the potential for success and the strategy required to achieve success before sailing into design. The environmental design outcome should be the result of intention, not good luck.

The following chronology of activities for the making of a successful reuse project are an extension of the preceding plea to identify and acknowledge the need for pre project evaluation criteria and goals.

1. Identification of a capital project to fill a defined need.
2. Consideration of "reuse" as an approach for the implementation of the project.
3. Identification of available space. Cross-match to basic program requirements, location, context, basic understanding of physical condition.
4. Set project goals:
   - Environmental/design
   - Cost
   - Financing
   - Time and schedule
   - Program/user needs
5. Develop feasibility of space to provide high "success potential" for project goals. This is done by providing conceptual solutions and applying an evalution checklist covering
   - Context
   - Finance
   - Planning
   - Codes
   - Environmental Design assessment
   - M&E systems
   - Operational/staffing requirements
   - Cost/benefit analysis
   - Implementation
6. The decision to proceed with the project is based on the ability of the proposed reusable space to adequately and creatively provide strong "success potential" for the program and the project goals. The level of potential necessary for a project "go" decision is the prerogative of each client and each design professional, and in this fluid context the design awards jury finds its mandate.
7. Project Design: Continuous evaluation by the client/architect team in response to the project goals is essential. Implementation and operation strategies must be considered during design.
8. Cost control strategy, engineering, documents: Creative construction management approaches to problem solving contribute importantly to goals satisfaction.
9. Project Implementation: Final scheduling and interface with operations should optimize cost/time/and benefit.—Construction begins.
10. Acceptance of project, move-in and start-up.
11. After an appropriate period of use, evaluation for user satisfaction/goals satisfaction.
12. Third party evaluation using previously established evaluation criteria.

Facility evaluation criteria panel summary and recommendations

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Facility evaluation panel

New health care facilities are expensive to construct, expensive to operate, expensive to maintain, and expensive to renovate. One obvious cost-saving strategy is to attempt to recycle older facilities. In certain situations, the reuse of a facility is indeed a viable and an attractive option, while in other situations the reuse may create unexpected operational and/or financial constraints. The decision t · reuse or demolish is complex and often filled with emotion. The Facility Evaluation Panel developed the following guidelines for evaluating reuse projects.

A. Contextual appropriateness

Planning for the reuse of a facility must be appropriate to the long-range physical planning goals of the institution. Prior to investing large quantities of money to renovate a facility, it should be determined that the facility is not physically located to preclude future long-range facility options. If the facility is simply in the wrong spot, to invest money in it would be an unfortunate decision.

The determination of the contextual appropriateness is the most basic examination necessary before developing a strategy to reuse a facility; in a sense it is analogous to facility "triage." It should be relatively easy and inexpensive to determine whether a building should be discarded. If it appears the facility does have long-term viability, the next question to ask is "Is it strategically sound to do so?"

B. Stra ›gic soundness for reuse

1. **Physical plant analysis.** First, the physical condition of a facility must be examined. It may not be cost-effective to rehabilitate, and there would be no point in proceeding with more detailed studies. What is the physical condition of the building? What modifications will be required to connect it to another building or to prepare it for a specific function? Are the floor to ceiling heights adequate? Are the floor loading capacities, the fire-safety code provisions, and the electrical/mechanical systems appropriate for the proposed uses?

2. **Financial analysis.** What are the past financing limitations and what will be the new financing arrangements? Would these new arrangements exceed the life-expectancy of the renovation and create stumbling blocks to a project later on down the road?

3. **Staging requirements.** What costs will be incurred in the staging of the renovation? Would certain services have to be curtailed for a period of time? If so, for how long? Must the building be evacuated during the renovation? If so, where will the employees that previously used the building work during this period? Must another building be prepared for these curtailed services and/or employees? Does the construction require phasing?

4. **Cost-benefit analysis.** To realistically determine the cost-effectiveness of reusing a facility, the cost of constructing a new facility must be determined. Unfortunately, "A" and "B" comparisons are not always comparable because the ground rules are different. One does not determine what it would cost today to rebuild the old building, but what it would cost to build a facility to meet the new programmatic needs. With modern hospital construction technologies (e.g., interstitial spaces, ninety-foot column spacing, solar-energy systems) the construction costs may be greater, but the over-all building operational costs lower. These questions raise complicated and complex issues which, on a practical basis, can ultimately determine the strategic soundness of the plan.

C. Fit

Is there enough space to meet the program requirements? Is this space geometrically satisfactory for the

intended program? If the program expands, is there potential for change or expansion? Will the final product be sensitive to human environmental needs?

1. **Program fit.** A Space Program is a complete listing of all the spaces (in net square feet) necessary to carry out the proposed service(s),* including the spatial requirements for mechanical and electrical systems, the circulation elements (i.e. elevators and corridors), and all general building utilities and services.

2. **Functional fit.** Assuming the space is large enough to contain the space program, is the space geometrically satisfactory? For example, is the column spacing satisfactory? A column in the middle of an operating room is obviously unacceptable. Peculiar shapes, low ceiling to floor heights, changes in floor level, and ramps may obviate the usefulness of the space.

Even if the space has no obvious geometrical constraints it will probably be necessary to go through a schematic design ** exercise in order to determine if there is an acceptable functional fit. For example, the location of the elevators and stairs could dictate the circulation pattern of the unit, which then affects the functional layout.

3. **Future fit.** Some spaces are more expensive to build than others; e.g. a laboratory suite is more expensive than an office suite. It would be unwise to locate a new laboratory within a building envelope incapable of future expansion. The future growth of a service must be anticipated.

4. **Human fit.** While human beings, when highly motivated, can live in extremely restrictive spaces for short periods of time (e.g. submarines, space capsules), "normal" work environments should be more responsive to human sensitivities; (e.g. natural lighting, interesting views, accessibility, spaces for personal needs (lounges, locker rooms, toilets).

D. Special attributes

Does the old building have a special architectural attribute which can be exploited? Examples could be a dome, an interesting architectural style, unusual stone or marble. Architects have the responsibility to use these elements, to incorporate them into the renovation, and not to ignore them, cover them up, or remove them.

E. Viewpoints of panelists

1. **James Marston Fitch.** Professor Fitch believes in reusing existing buildings for several reasons. First, new is not necessarily better, and many buildings embody the social, historical and cultural heritage of their community. To remove that building from the community might be unfair and unreasonable, especially when many of us in planning do not live in these communities and may not be sympathetic to what may appear to be undue sentimentality.

Secondly, Professor Fitch pointed out that a building represents an investment in energy. Energy was invested to make the bricks, the steel, the glass, and that energy it requires to make building products. Even though, when originally created, these products had a lower cost than today, their value has appreciated because the amount of energy it takes to make them has remained constant. Before we consume new energy we must carefully examine the value of old energy, and be extremely cautious when we throw it away.

2. **Gary Larson, A.I.A.** Mr. Larson felt that there were building code constraints which interfered with creative, innovative design evolutions. These codes, well-intentioned as they may be, embody conventional wisdom; they restrict, if not preclude, new approaches to design. For example, hospitals are required to have eight-foot corridors. If an old facility can only accommodate a 7'-6" corridor, should this factor alone sink the entire project? Will a 6" shortage really affect patient safety or traffic circulation?

While there are mechanisms to request waivers, the process is complex; furthermore, reviewers tend to respond bureaucratically. It is often "safer" to deny waivers than to take the risk that the change may be criticized later. For example, fire-safety codes may require adding a stairwell to the facility. Whether this adds to the safety or not, if the building should burn and people are killed, the bureaucrat could be criticized for approving a waiver not to provide the stairwell. It is far easier to deny a waiver.

There is a profound need for national codes which would standardize the code requirements throughout America, yet still be responsive to atypical or regional situations.

3. **William Spense Black A.I.A.** Mr. Black was concerned with methods to determine a building's condition. In many cases, there are no "as is" drawings. In many cases, plans are unavailable. It is expensive

* The existing methodologies to determine space needs are empirical rather than analytical. The Facility Evaluation Panel identified space programming as a subject requiring more research.

** Determining quantitative criteria for evaluating design efficacy is a subject requiring more research. It involves studying aspects of human behavior, how people work, how equipment relates to space and people, etc.

and difficult to accurately describe the condition of a building. It can be done but the issue is to determine how much time and money should be spent on it. If a building is in terrible condition, it should not require a $25,000 study to document that fact. It would be very helpful if architects and engineers shared methodologies for analyzing the physical characteristics of a building.

Questions for research

1. How should spatial requirements for specific departments be determined? How is a service requirement converted into a space requirement, and what criteria can be used to evaluate alternative delivery approaches? The entire area of Functional Space Programming needs additional research.
2. How can the functional efficiency of a design be evaluated? What are acceptable net-to-gross square footage conversion factors for reuse construction? Can we develop systems to measure or quantify how well a department works in a given space or spacial configuration? We need methodologies which will allow us to go from a good idea stage to higher levels of confidence in order to make clear decisions on the expected potentials of reuse projects.
3. What constitutes the most useful, if not the most rigorous,; analysis of the existing physical condition of a building? What techniques or methodologies are available to determine a building's suitability for reuse?

Closing address

Steven Jonas, M.D., M.P.H.

Closing address: Future directions in health facility reuse

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Congratulations to those hardened souls who have lasted this long. First of all, I would like to extend the thanks of those of us who organized this program, to all of you who came, and contributed so much to it. Second, I think that we owe special thanks to Bill Parker, who was the Project Director and Dorrine Veca, the Administrative Coordinator who really did the gutsy organizational work involved in setting up this conference. We would like to thank Michael Jordan for his photography, and for his graphic design. We, of course, want to thank the principal sponsor, the National Center for Health Services Research and the project officer Frantz Wilson, and also our co-sponsor, the American Hospital Association, project officer Joseph Sprague. And finally, we would like to thank the students in the Health Services Planning and Design Program who did so much of the basic work in making these three days go along so smoothly.

Introduction

One of the major historical forces creating the problems faced by planners, builders and program operators in the health care delivery system, confronted repeatedly in various guises by all the various panelists, is the high rate of technological development in our industry. Jim Kimmey has pointed out that the medical community often says: "It can be done, therefore it should be done." He has also pointed out that many health sector critics of health care planning claim that planning drives out technological change. It happens that our industry is not the only one in which technological change is quite rapid in the current era. Listen to what Leonard Koppett, one of our most astute and data-oriented sports writers, had to say recently on technological change in the sports industry.[1]

> "Twenty-five years ago, it would have taken a profane imagination to predict that athletes would be playing on artificial turf and synthetic court surfaces or using aluminum bats, aerodynamically designed tennis racquets, titanium golf clubs, and fiber glass poles—all under the watchful eye of videotape machines and computer analysts.
>
> "Technology has changed the way virtually every game is played. And yet in most cases the effects are almost invisible to the spectators.
>
> "The golf clubs used by Jack Nicklaus or Tom Watson are strikingly different in construction from the ones used a generation ago by Ben Hogan or Jimmy Demaret—but the stroke average of the leading players is virtually the same.
>
> "Baseball played on artificial turf requires adjustment in the positioning of fielders, decisions about bunting, and newly designed shoes, but neither scores nor statistics are drastically different.
>
> "Football teams use movie film and computer printouts to analyze strategy, evaluate personnel and refine playing techniques—but the actual games produce virtually the same mix (number of plays, points scored, margins of victory) as thirty years ago.
>
> "The modern tennis racket, made with new materials and designed in the light of sophisticated aerodynamic principles, can hardly be compared with the wood and gut racquets used half a century ago—but the frequency of service aces, in which the effect of a better racquet would show most clearly, has not noticeably increased.
>
> "All of these examples make several points about the nature of technological changes in sports. They have a great effect on techniques used by the players without a correspondingly great effect on the results achieved. They make games easier for the ordinary recreational player, but don't change the relative strength of professionals competing against each other at the highest level; they make games safer, create better conditions for playing, and constantly increase the complexity of the paraphernalia, but they do not touch the underlying simplicity of purpose around which each game is built."

The parallels with the health care industry are striking. We have seen enormous technological changes in this century, especially since World War II. These changes, however, have had little effect on population health levels, to the extent that we can measure them. Therefore, severe problems have been created in the health care delivery system for which reuse/retrofit/reconfiguration is hopefully one solution. Most technological developments have had little effect on what is

supposed to be the health care delivery system's principal product, health, yet technology continues to develop apace. If it is not improved health, then there must be other motivations for its continued development. And indeed there are. Improved care of the sick, improved profits, and intellectual challenge. The latter two definitely exist and the first may exist. But the major problem is that most modern health care technology is linked to curative medicine, an activity that has little effect on the population's health. This is a theme to which I will return later.

The health services market

At this time, I would like to comment in a sort of random fashion on a few points made by various of our speakers and presenters. First of all, I would note the peculiarity of the health services market. The nature of the health services market must be understood when economic decisions are made. As a non-economist it has taken me a long time to understand it and I don't think I understand it yet. But this is what I see. Payers and recipients of services make few buyers' decisions in the health care delivery market. Among the sellers, only certain sellers make their own decision to sell. Now we have a broad range of sellers in the health care delivery market. Among them are hospitals, drug companies, hospital supply companies, and physicians and other practitioners. However, a majority of the decisions for selling are made by one and only one segment of the sellers: the doctors.

Under a fee-for-service reimbursement system, the incentive for physicians is to sell their own and others' services. The normal rules of competition and normal buyer/seller roles do not apply. To understand how the health care services market works, we might create an analogy of what the automobile industry would be like if it operated as the health care delivery system does. Under this system, a person would make the initial decision that they would like to have a new car. And they would make the initial decision to walk into the automobile dealer showroom. Thereafter all decisions would be completely out of their own hands. The salesman would tell them that they definitely needed a new car, the salesman would tell them what model they needed, what size they needed, how much it should cost, what the extras would be on the car, and so on. And in many cases, a "third party" would be footing the bill.

The physicians, and to a lesser extent other licensed independent health service private entrepreneurs, are the gate keepers of our market; perhaps "gate-openers" is a better term. This has enormous implications for recycling health facilities. Related to this, and just in passing, I must mention a very important subject to which we have had little time to give attention at this particular conference: the reimbursement mechanism for health services is skewed, as we all know. Therefore, in considering the reconfiguration of buildings, it really makes little sense to provide for a service which is not readily reimbursable, particularly if one motivation for reconfiguration is to maintain or improve income for a building which has not yet been paid off. Therefore, an important, although secondary, interest of planners, builders and acute care institution operators should be to press for a broad universal system of national health insurance so we can take the skewing out of our reimbursement mechanisms.

The "devil theory" in adversary relationships

One set of comments that I heard quite a bit in both private and public discussions was what I like to call the "devil theory" of problems encountered by program operators and builders and planners and organizers. The "devil theory" states that when one is in an adversary situation, the basic cause of the adversary situation relates to the personalities, intelligence (or lack thereof) and general capabilities of people on the other side of the table. This is what one often hears, regardless of who the players are: "If only *they* were more intelligent, more sensible, more rational, better educated, if they were only good people, all of our problems would go away."

Several years ago, I had an opportunity to do a study of certain aspects of the work of the New York State and New York City Health Departments in regulating the quality of ambulatory care.[2] These are two departments which have a long history of an adversary relationship. I know people in both departments very well. They strike me as generally good, intelligent, competent people —you should hear what they have to say about each other. When I hear this sort of thing, I am often reminded of the statement: "We have met the enemy and they is us." In fact, personnel are not constant within a particular agency over time. There are many shifts of people. Often in one year a person will be on one side of the table, and the next year he or she will be on the other side of the table. It's hard to show a discernible change in intelligence or educational background, although the comments made about that person will change.

I think that what we have to begin to understand, for example in the building process, is that if we have conflicts over plans, or resource allocation or program, between institutions on one hand and regulatory agencies on the other, they are often problems which are intrinsic in the system. They are a result of the history of the development of our health care delivery system. They are problems which are the result of recurring contradictions in the system. There is some relationship to the personalities of the players in the game, of course, but in most cases the relationship is relatively minor. To repeat, we have to understand that we are primarily dealing with problems created for us by the system in which we are working and by the history of that system, not problems primarily created by the personalities of the people who are working in the system.

I think, however, that a secondary contributor to some of these problems, is the differential in salary scales between the public sector and the private sector. In medicine, administration, architecture and a number of other fields, it is certainly more lucrative for people to work in the private sector than it is in the public sector. And one thing that this does is to discourage people from making long-term careers in the public sector and in certain cases produces people in the public sector that are survivors but nothing else.

Problems of building codes and planning requirements

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On the constraints created by codes and planning agencies, we've heard a great deal in the last two and half days. I think that what is happening is that the facilities' builders—and I hope the architects will please excuse me if I lump the construction companies with the architects—and program operators are now paying for the sins of our fathers. Unregulated and unplanned building services development have produced many problems in the health care delivery system and these are real, objective, problems: high cost, cure orientation, maldistribution, barriers to utilization, problems of quality and quality assurance, among others. An understanding of this does not make it easy for participants but it does provide some perspective.

A final random comment, with due respect to my friends who are on the other side of the question. I think that people who now deny that we have excess hospital beds are like those people who denied the existence of the germ theory of disease twenty years after the discoveries of Louis Pasteur.

Factors responsible for improving health levels in the population

Now I would like to return to the problems of technological development and the goals of health care delivery systems. What are the possible outcomes for the work of health care delivery systems? Health in the population, however health might be defined, should be the principle outcome. However, there are other outcomes: mitigation of disease in individuals, research, education and replication of ourselves, career satisfaction, high incomes, and profits. First, we will deal with the question of health since it should be the principal outcome of the functioning of the health care delivery system.

If we analyze population health levels in the Western world over the past three centuries, we see that they have generally been rising. We are forced to measure improved health levels indirectly because we do not have any satisfactory measures of health. But generally, we measure improved health levels by observing mortality rates, which have been falling, morbidity and sickness rates, which have been falling, and related to decreasing mortality/morbidity, increasing population. (This analysis is based largely on the work of Thomas McKewon.[3]) The major factors responsible for improving health levels over the past three centuries in the Western world have been first improved nutrition, beginning simply with the increased availability of calories. This development was related to an agricultural revolution in Western Europe that began late in the seventeenth century, and also may have been related to climatological changes. It was also related to improved distribution systems which began appearing in Western Europe in the eighteenth century with the development of canal systems so that food could be distributed more widely and more efficiently.

The next major factor that we can point to, relative to improving health levels, is the sanitary revolution that began in the last third of the nineteenth century, related to the provision of pure water supply and sanitary sewage disposal, and to the provision of pure food. The third major advance which we relate to improved health levels is immunization.

These three major advances were all preventive measures. They were all measures which relate to the prevention of disease. Perhaps if we had direct health status indicators, we would be able to show positive effects of treatment measures. But we do not yet have universally agreed upon and easily measured health status indicators. Thus, as far as we can tell today it is prevention which has been the key factor in improving the health of the population. This is not to say as some proponents of this view do, that treatment is not of utmost importance. Effective treatment *is* of utmost importance to individuals with illnesses which are subject to treatment. That treatment msut be of the highest quality. But the effects of treatment services do not show up in our analysis of improving health levels in the population.

Definitions of prevention

This analysis tells us something very, very important about the direction in which our health care delivery systems should be going if our primary concern is for improving the health of the population. Let me briefly define for you how prevention and preventive services can be classified. There are two ways to do this: One is to say that there are community wide preventive measures, individual preventive measures, and what we call combined preventive measures. Community-wide preventive measures are those applied to the community as a whole. Individuals are simply not aware of them, unless they are specifically informed. Such measures include the chlorination of water, the provision of sanitary sewage disposal, the provision of hygienic foodstuffs. Individual preventive measures are those which are applied directly to individuals. They include such things as smoking withdrawal programs, counseling for obesity, and early detection programs for such diseases

as hypertension and diabetes. A combined preventive measure is one which protects the individual against the acquisition of a particular disease, while at the same time protecting the whole community by reducing the potential for disease spread. The best example is immunization. So we can look at community, personal, and combined preventive measures.

We can also talk about primary and secondary approaches to prevention. Primary prevention includes measures of any kind which protect somebody from getting a disease at all. For example, the provision of a pure water supply prevents us from getting water-borne diseases. I happened to have just returned from a community which had not been careful about purifying its water. I came back from a trip to Vail, Colorado with a water-borne parasite. Fortunately a treatment measure was available, and although my cure will not show up in the health statistics of the population, as an individual I am delighted that I responded. Secondary prevention measures are generally those which involve early detection of disease. For example, we cannot prevent hypertension, and we cannot prevent diabetes, but we can detect them early and bring them under treatment. Therefore, we can prevent the development of complications of those diseases.

Doing the doable

Now, sometimes those of us in the field of medicine have a tendency to bemoan all of the stuff we don't know: we don't know how to do this, we don't know the "cause and cure" of that. However, there are quite a few things that we do know at the present time. While we tend to look at the hole rather than at the donut, we do know a great deal about preventive measures which can be applied to a whole range of common diseases in the United States, both major killers and major causes of morbidity. I don't have time now to run through them, but I think that most of you are aware of what we could accomplish of benefit to the population's health status if we reduced cigarette smoking, if we introduced proper eating habits, if we controlled obesity, if we reduced the existence of cancer causing agents in the environment, if we improved work place safety, if we improved automotive safety. And these are kinds of measures that we know a great deal about. Just as an epidemiologist living in central London in the 1850's was able to figure out how the disease cholera was transmitted before anybody knew that there was a microorganism—a little bug—that caused cholera, so we know now how to prevent a large proportion of cancers, without knowing the cause of cancer—the biological cause of cancer.

In addition to our knowledge of prevention, we also know a great deal about calculating and quantifying health needs in the population. We know how to apply the science of epidemiology to the study of a population—figure out what its disease profile is and what its health services utilization profile is. By comparing one population to another in terms of their demographic characteristics, we know how to calculate unmet needs in relationship to services that are available. We also know a great deal about program planning. We do know how to calculate space and personnel needs, we know how to predict costs, we know how to predict utilization rates. All of these things we cannot do perfectly, but we can do them with *some* accuracy. A major problem I believe that we face right now is not a paucity of knowledge, a paucity of data, but the difficulty of the implementation of new and different service programs in our current producer-centered system. The producer-centered, not consumer-centered, system we have presents us with some very serious development problems. Those are the ones I think we have the most trouble in dealing with.

Prevention and health manpower

Let us look at the matter of the producer-centrality of the system for a moment. A producer-centered system is one which does a very good job of providing good terms and conditions of employment for the people who work in it, especially the ones at the upper end of the system's social hierarchy. A producer-centered system does a very good job in dealing with their income needs and their professional needs, and with their careers. I think that the producer-centrality of the system, provides us with a very important message: while we're beginning to plan for the reconfiguration of health care facilities, we must also begin to plan the reconfiguration of the health manpower that works in it. Since the physician, through the licensing mechanism, controls the center of the system, we must begin health manpower reconfiguration with him or her. I obviously do not have time to go into details, but I believe that reconfiguration of health manpower begins, and should be based, upon the following principles.

First, we have to have prevention orientation rather than cure orientation for the people who will be working within the system. Second of all and related to this, we have to have a manpower pool that has broad concerns for health first, disease second. Health manpower has to be prepared to take the leaderships between manpower categories and their work which are appropriate to the length and intensity of their training. Just as one example, we have had enough studies now in the last five years on the efficacy of using nurse practitioners and physicians' associates in providing primary care to indicate that the bulk of primary care probably should be done by nurse practitioners and physicians' associates, and that in most instances, it is most likely inappropriate to have highly and very expensively trained physicians doing primary care. Finally, we should have a reimbursement system for our health manpower based on the following principles: it rewards quality as well as quantity of work; promotes prevention orientation;

and it is consistent with both the social nature of the health providers' set, and the social basis of the health care financing system.

Historical factors in the contemporary design of the health care delivery system

The moderator is tapping me on the shoulder and telling me that I must finish in the next five minutes. Therefore, let me leave you with some final thoughts on future directions for reuse, retrofit, and reconfiguration. I believe that we must begin to develop the future by looking at the past. Why do we have an acute care oriented system? I believe that there are several reasons for this. First of all is the influence of Cartesian philosophy. Descartes in the 17th century established two important principles which he used in the examination and evaluation of human beings. One is that there is a separation between the mind and the body. The other is that the body part is a mechanical structure. Descartes went on to say that one can understand the workings of that mechanical structure on a simple cause and effect relationship much as one can understand other simple machines.

This philosophical influence is rarely articulated in medicine. It is probably not even recognized by the vast majority of physicians. However, it has a tremendous influence on the course of our work, this Cartesian mind-body separation, mechanistic cause and effect understanding of how the body works.

The second important historical fact which produced the contemporary cure orientation is the nature of the forebears of the modern hospital. The forebears to the modern hospital were built starting in the 18th century. There were few of them, but they had a tremendous influence on what the contemporary hospital looks like. Eighteenth century hospitals were built as acute care institutions. They had rules which in the beginning were actually enforced directly by the board of trustees. Pennsylvania Hospital, the first hospital in this country, had a system in which on Monday and Thursday mornings, members of the board of managers (trustees) would review the cases of the people who had asked for admission. The managers made the decisions as to whether somebody got in or not. Boards of trustees don't do that kind of thing anymore, but they did in the eighteenth century. And for the most part they accepted only "curables."

In terms of 18th century medicine, in most cases that must have meant persons with self-limited conditions, for there were very few cures available for anything. Everyone else who was sick in any way went to the poor house, if one were available. In the 19th century, cure orientation was encouraged by developments in pathology, a science which began in the middle of the 19th century. These disciplines all seemed to prove the correctness of the Cartesian mechanistic approach.

A third major factor which produces cure orientation is the fee for service system of physician reimbursement. If you get paid for treating, paid for curing, and don't get paid for preventive services, the natural human inclination is to engage in treatment services. Once third party reimbursement mechanisms came in, they tended to encourage the cure orientation because of their concentration on hospital in-patient services. Of course, the fee-for-service system and indeed the medical profession have had a great deal of influence on deciding what kind of reimbursement ssytems we should have. The fifth major factor in developing cure-orientation is the Hill-Burton program. It was very important at the time and as we know certainly encouraged the construction of a large number of acute care hospitals around the country. The sixth factor is the medical education system, which trains our doctors to have a treatment orientation, prevention receiving very little attention in the American medical education system, either at the undergraduate or graduate levels. Finally, there is an observed natural tendency for any kind of system to perpetuate itself. In terms of provider/patient relationships, things have changed very little in this century. Once the providers had some scientific tools which enabled them to start treating certain diseases and cure individual patients, some in dramatic fashions, a pattern was established which has the tendency to perpetuate itself.

Current needs of the health care delivery system

The current needs for new and expanded services in the health care delivery system have been repeatedly listed for us at this conference. I will run through some of them, briefly: ambulatory care, community mental health services, dental services, rehabilitative services, long-term care, home care, adequate maintenance of the elderly, and preventive services. These are all functions which need a facilities base. The obverse of expansion in the listed services areas is the necessary, carefully planned reduction of the number of acute care hospital beds in the United States. I think, therefore, that the major challenge which faces us in reuse, retrofit, and reconfiguration, is not dealing with the physical problems, but rather is dealing with the system problems, with the health manpower problems, with the ideological problems, and the political problems. History teaches us that these changes will not be accomplished easily. But for the health of the people, as has been shown historically, they must be accomplished.

Final thoughts

I think that the research agenda we have developed in this first, much needed step, the convening of this conference, will make an important contribution to the process of change. As we begin to investigate, we will find that in addition to, and beyond the problems of

physical structures, we are dealing with system, ideological, and political problems. This is a strain that ran through virtually every presentation, from Codes and Standards to Systems Approach.

One of the reactions to the conference that has been expressed to me, and that I sensed touring around to the various panels, was that there is some feeling of frustration at the sometimes lack of concreteness of the discussions. I think that there is a very good historical reason for this. I think it is not something that should upset us. The reuse of buildings, the reuse of health facilities is a process which has been going on for centuries. However, to my knowledge this is the first, or certainly one of the first conferences of this kind where people from various disciplines have come together to begin to try to codify and to understand, to provide the theoretical basis for what we are doing. In the beginning of any kind of process like that, there is some confusion as we begin to grasp "this" or make "that" concrete. It's as if we were a group of people—again to use the germ theory of disease analogy—sitting down in 1850 before Virchow began to develop the science of pathology and certainly before Pasteur demonstrated that there were disease causing organisms in the air, having a conference about infectious disease. If you look at conferences about infectious disease which occured before the discovery of germ theory of disease they produced just about as much confusion, if not more, than we produced here. I think that what we have done is to begin a very important process. We have begun to lay the theoretical basis for understanding what we are doing in reuse, retrofit, and reconfiguration. We have begun to lay the theoretical basis for creating a planning system for reuse, retrofit, and reconfiguration which will provide us with the opportunity to do these activities on some kind of rational basis that is related to health care system.

With that, I will thank you again for all coming. Hail and farewell.

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Health facility reuse design awards

The Health Facility Reuse Conference solicited design exhibits through announcements in *Architectural Record Magazine,* and the AIA newsletter "Memo." Approximately 40 design projects were submitted, and the Design Jury selected the following award winners.

First award: category I
Moshassuck Square Arcade H.M.O. for
Rhode Island Group Health Association
Providence, R.I.
by: Steffian-Bradley Associates, Inc.
Boston, Mass.

Moshasuck Square Arcade, built as a mill in Providence, Rhode Island in 1870, has been restored and adapted by Steffian-Bradley architects to house 48,000 square feet of H.M.O. for the Rhode Island Group Health Association. A furniture store and warehouse until 1978, the building has been skillfully restored, translating a commitment to preventive medicine into work that reinforces the fabric of a historic district.*

First award: category II
The Inpatient Dining Facility
Brattleboro Retreat, Brattleboro, VT.
by: Perry, Dean, Stahl & Rogers Architects
Boston, Mass.

A kitchen-dining facility for the Brattleboro Retreat, in Vermont, has been skillfully fitted into a chain of older buildings by architects Perry, Dean, Stahl & Rogers. The program called for fitting a function ideally suited to a one-level arrangement into a narrow four-story brick structure without destroying its character and fabric, and preserving the chain-like sequence of the neighboring buildings.*

Design Commendations
Dental School Continuing Education Facility for
University of Oregon Division of Continuing Education
Portland, Oregon
by: Zimmer Gunsul Frasca Partnership
Portland, Oregon

At the Dental School Continuing Education Facility of the University of Oregon, Portland, architects Zimmer Gunsul Frasca have taken the basement/first level of an older addition and recast it as a place to provide refresher courses. Originally used as a cafeteria, storage and mechanical area, it now houses a separate entrance and reception area, administrative offices, labs, demonstration and conference areas, x-ray facilities, and four operating areas. The play of warm colors and of skillfully handled lighting gives the place a unified but endlessly interesting character.*

Neonatal Intensive Care Unit for
New York Hospital—Cornell Medical Center
by: Skidmore, Owings & Merrill
New York, New York

This unit at Cornell Medical Center in New York, by Skidmore, Owings & Merrill, is a very sensitive reconfiguration of an existing facility. The design incorporates the most advanced technology in this critical area of care, is graceful, direct, and accommodating while ensuring maximum efficiency. Most importantly, the designers have paid particular attention to easing the emotional and psychological strains that are inevitable for both family and staff in such an intense setting.*

Massachusetts General Hospital
Surgical and Special Services Building
by: Perry, Dean, Stahl & Rogers
Boston, Mass.

In the Surgical and Special Services Building for Massachusetts General Hospital, Perry, Dean, Stahl & Rogers accomplished several retrofit solutions. The existing roof, raised eight feet, now houses a pioneering energy-conservation heat-recovery wheel. Spatial innovation for the patient bedrooms includes a patient-service module that has the appearance of household furniture while at the same time integrating the technical, lighting and storage needs.*

Jersey City Health Center for the
City of Jersey City and Jersey City
Board of Education
by: The Hillier Group, Architects
Princeton, N.J.

The Jersey City Health Center, by the Hillier Group, is a delightful diagnosis center for school-age children that has been fitted into the outmoded and abandoned floor of a hospital. Children take "school trips" here for the purpose of staying well, learning something, and having fun in the process of consultation.*

Cumberland County Medical Center
Cumberland County Manor Nursing Home
Bridgeton, N.J.
by: Architects II, P.A.
Vineland, N.J.

At the Manor Nursing Home of the Cumberland County Medical Center, the firm of Architects II removed those areas of buildings which could not conform to building codes, renovated other buildings, and engaged in new construction for bed replacement and needed support services. Because of the complicated nature of the work, and considering that the facility had to remain open during construction, very careful phasing was essential.*

Sharon Hospital
Sharon, Connecticut
by: Arneill-Kagan & Associates, P.C.
New Haven, Connecticut

The Sharon Hospital in Sharon, Connecticut, and architects Arneill-Kagan faced a typical problem of converting from an inpatient care emphasis to a more balanced use of all functions. Once a new east wing was operational, existing functions were removed from the non-conforming buildings which were then demolished. The complex phasing problems of implementing a program of this kind have been overcome with very pleasant results.*

Lutheran Medical Center
Brooklyn, New York
by: Rogers, Butler, Burgun & Shahine Architects
New York, New York

The new Lutheran Medical Center by architects Rogers, Butler, Burgun & Shahine is the first major recycling of such a building for health care. Originally, the five-story concrete structure was a bowling pin factory and warehouse. Today, it is a "new" 532-bed acute care hospital. This is the granddady of all reuse projects.*

The members of the Health Facility Reuse Design Jury were:

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Juror:	Michael Bobrow, AIA Partner Bobrow, Thomas & Associates Los Angeles, California
Juror:	Allen Green President and Treasurer Educational Facilities Laboratory New York, New York
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Conference Agenda

DAY ONE April 24, 1978

10:30-12:00 Pre-Conference Faculty Meeting at Faculty House

1. Welcoming remarks
2. Introductions
3. Conference organization
4. Review schedules
5. Committee mock session
6. Questions and discussion

12:00- 1:00 Faculty lunch

12:00- 2:00 Registration

2:00- 4:00 Keynote session "Needs & Priorities"

1. Welcoming remarks
2. Introduction and objectives
3. Keynote introduction
4. Keynote address
5. Questions/discussion

4:30- 6:30

DAY TWO April 25, 1978

8:00- 9:00 Coffee

9:00- 9:45 General session: "Critical issues"

9:45-10:00 Break

10:00-12:00 Committee sessions

1. Introductions
2. Agenda/schedule
3. Presentation
4. Question and answer session

12:00- 1:30 Lunch

1:30- 3:00 Committee sessions (Reactions)

3:00- 3:15 Break

Reaction 1
Reaction 2
Reaction 3 (Questions and Answers)

3:15 - 4:30 Committee sessions (Outline, policy positions and research agenda)

DAY THREE April 26, 1978

8:00- 9:00 Coffee

9:00- 9:45 Final Report: Financial feasibility

9:45-10:30 Final Report: Codes and standards

10:30-10:45 Break

10:45-11:30 Final Report: Planning strategies

11:30-12:15 Final Report: Project implementation

12:00- 1:15 LUNCH

1:30- 2:15 Final Report: Systems approaches

2:15- 3:00 Final Report Facilities evaluation

3:00- 3:15 Break

3:15- 3:45 Design Awards Presentations

3:45- 4:30 Concluding Address "Future Directions"

APPENDIX II. Participants' Evaluations

A. Description of the Evaluation Program.
B. Evaluation form.
C. Summary of participants' comments.

Appendix II: Participants' evaluations

A questionnaire was distributed to all conference participants to determine first, the registrants evaluation of the overall conference; second, the usefulness of the information presented; and third, information which might possibly lead to future research on the reuse of existing buildings for health facilities.

Population and sample

A total of 127 questionnaires were distributed on the first day of the conference, and the completed evaluations were to be returned on the third day following the concluding session. A total of 50 questionnaires were collected, representing a reply rate of 39.4% of the total 127 distributed.

The evaluation questionnaire

Through question #1, a general breakdown of the different professional affiliations of the attendees was determined. Participants were asked to stipulate whether they were associated with the American Institute of Architects, the American Hospital Association, the Health System Agencies, or "Other" areas outside the preceding three. However, some of the registrants also wrote in that they were affiliated with various combinations of the AIA, AHA, and HSA's.

Figure #2 illustrates that the majority of responding individuals were from "Other" professional affiliations. The largest single group represented at the Conference was probably the HSA's, because most of the 12% that checked a combination of affiliations had HSA's as one affiliation. That group, added to the 20% that checked HSA, represent a major portion of the Conference attendees. Generally, there was a sufficient balance of professional affiliation to insure a multidisciplinary approach to the Conference objectives.

The response to question #3 (see questionnaire) showed that 58% of the sample felt that the time alloted for each activity was adequate, and 28% indicated that it was not adequate. Additionally, the majority of comments indicated that more time should have been allowed for the Critical Issue Panels. There was a feeling that the panels concerned complex issues, thereby requiring more time for in-depth discussion. The remaining 14% either did not respond to the question or presented both a yes/no answer.

Questions 4 and 5 provided information essential in assessing the content of the Conference. First, in question 4, was the information obtained useful for the professional activities of the attendees? As shown in Figure 3a, a large majority, 82%, felt that it was, 16% believed it was not and 2% did not respond. Second, in question 5, what was the overall level of the material presented? As indicated in Figure 3b, a majority of 56% concluded it was "Medium," while 38% considered it to be "High." Only 2% of the respondents felt it was "Low." The remaining 4% expressed no opinion.

Summary of participants' comments. The format of questions 6, 7, and 10 require that the comments be summarized and that some general themes be expressed. This was an easy task since, regardless of professional affiliation, the participants' comments were similar.

In response to number 6, there was a strong feeling that attendees should have been able to participate in

Figure 1: Reply percentage on evaluation questionnaire.

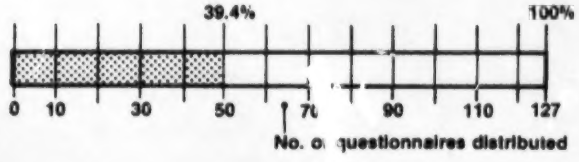
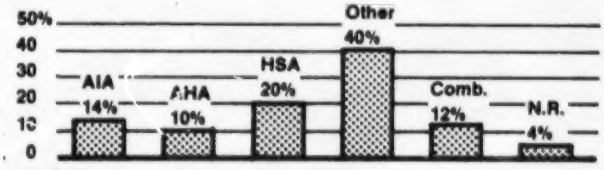


Figure 2: Distribution of professional affiliation of conference attendees.



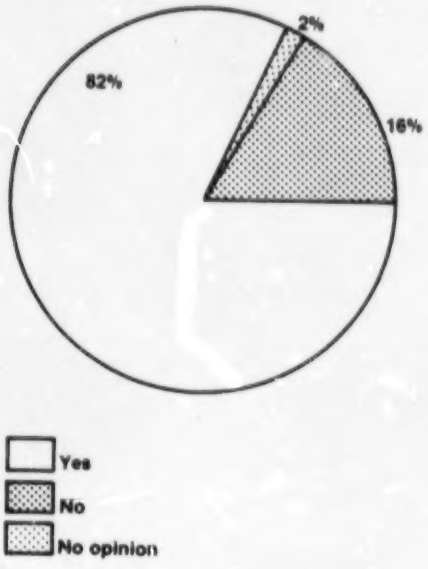


Figure 3a: Reply percentages on usefulness of information presented.

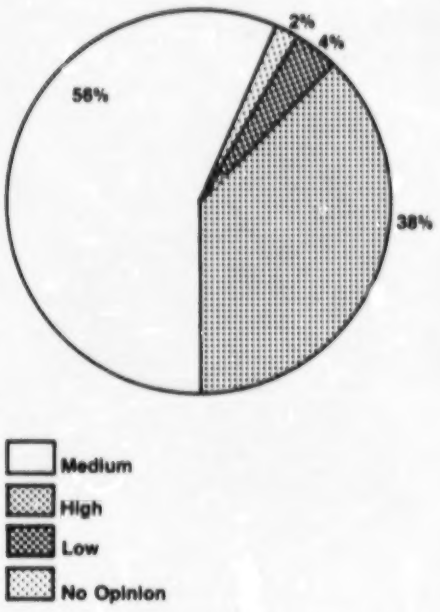


Figure 3b: Percentage of overall level of material presented.

two or more panel discussions. The recommendation was that more time should have been allotted. Another recommendation was that there should have been some case study presentations.

Since there was a definite leaning toward more variety (i.e., participation by institution-based personnel) in the panel membership, an uncommon remark was that there was some redundancy due to the heterogenity of the participants.

Question 7 was very significant since the comments could become sources for future research topics. Also, the tendency toward themes was most strongly demonstrated here. The majority of comments were easily categorized into four areas. The first and most often recommended was that a conference report and/or policy recommendations be distributed so that the committee suggestions could be implemented. The second most expressed comment was that there be a follow-up conference, to further develop and extend the issues made. The third recurrent theme was that case studies be conducted on reuse projects; and the fourth was that each of the six Critical Issues be investigated individually.

This classification into four categories comprised about 70% of the total response. The remaining 30% consisted of more atypical replies, some of which are presented as follows:

- "Our special interest was the HMO and its future as solutions to providing medical care. . . . We would recommend this alternate method for further study."
- "Short courses (2½ days) on the specific topic areas . . ."
- "Serious research issues were raised. Reuse, retrofit, and reconfiguration are irrelevant. Real issues are elsewhere."
- "There should be a focusing/convergence on the pertinent recommendations through the use of some 'brainstorming' by experts."

Unlike 6 and 7, question 10 did not present such clear themes. However, it reiterated the comments and suggestions found in response to the other questions. It acted more or less as a summary for the entire questionnaire. A sampling of the remarks are presented here:

- "The conference would have been more effective if there was an extra day."
- "More reactors should have had health services backgrounds."
- ". . . . effective if the proceedings are read and acted upon."
- ". . . . depends on what viable answers and projects result from the conference."
- ". . . . difficult for all levels to be at the same level of interest and involvement due to the different levels of knowledge and experience."
- ". . . . enjoyed the mixture of the points of view. It was a good structure for a complex subject."
- ". . . . would like to have attended other committees."
- "If suggestions of the conference can be researched, the combination was effective."

Conclusion

Although objective interpretation of the results is difficult to attain, the data seems to indicate two clear points of information. One, there is an active interest by participants to know the results and recommendations put forth by the committees. Two, there is a strong desire to see follow-up research conducted in the area of health facility reuse.

Health facility reuse conference
Evaluation questionnaire:

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1. Check your major professional affiliation: ____AIA ____AHA ____HSA ____Other
2. Which committee did you attend?: a. ____Financial Feasibility
   b. ____Codes & Standards
   c. ____Systems Approach
   d. ____Project Implementation
   e. ____Planning Strategies
   f. ____Facility Design Evaluation
3. Was the time allotted for each activity adequate? ____Yes ____No
   Comments: _____
4. Did this conference provide information useful for your professional activities? ____Yes ____No
5. How would you rate the overall level of material presented? ____Low ____Medium ____High
6. Were there any major omissions or weaknesses?
   _____
7. What follow-up to this conference would you recommend?
   _____
8. Was the registration fee: ____High ____About Right ____Low
9. Were there adequate opportunities for audience participation? ____Yes ____No
10. Was the combination of research and public conference effective? ____Yes ____No
    Comments: _____

Appendix III: Bibliography

Editor's Note: The original intention of the conference was to produce an annotated bibliography on the subject of health facility reuse, retrofit, and reconfiguration. Unfortunately, due to lack of time, we were not able to complete that portion of the work. The following is a brief bibliography prepared by the American Hospital Association on the subject.

HEALTH FACILITY REUSE

Selected References
Prepared by the American Hospital Association
April 1978

The following bibliography of selected references was provided by staff of the Division of Health Delivery Systems, American Hospital Association, based on sources provided by the Library of the American Hospital Association, Asa S. Bacon Memorial. Citations refer to journal articles or monographs generally available in most health science and/or local libraries. To expedite service, materials should be requested from local and regional sources rather than directly from the Library of the American Hospital Association. Reprints and monographs may also be obtained directly from the publisher. For additional references, please consult the *Hospital Literature Index,* published quarterly by the AHA.

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National Center for Health Services Research publications of interest to the health community are available on request to NCHSR, Publications and Information Branch, 3700 East-West Highway, Room 7-44, Hyattsville, MD 20782 (telephone: 301/436-8970). Mail requests will be facilitated by enclosure of a self-addressed, adhesive-backed mailing label. These publications also are available for sale through the National Technical Information Service (NTIS), Springfield, VA 22161 (telephone: 703/557-4650). PB and HRP numbers in parentheses are NTIS order numbers. Publications which are out of stock in NCHSR are indicated as available only from NTIS. Prices may be obtained from the NTIS order desk on request.

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(PHS) 78-3224 Grants for Dissertation Research Support
(PHS) 79-3240 Grants for Research on Quality and Economy of Drug Prescribing
(PHS) 79-3253 Extramural Associates Program

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16. Abstracts

Health facility reuse is an activity which will become an increasingly common strategy to address the linked problems of rising health care costs and surplus of acute care hospital facilities. The health facility reuse conference conducted in April 1978, at the Graduate School of Architecture and Planning, Columbia University, investigated "reuse" from six critical issue perspectives: financial feasibility, codes and standards, systems approaches, project implementation, planning strategies, and design evaluation. Policy issues and future research agenda are presented for each critical issue, and priority activity areas are recommended. Any health organization must be considered an infrastructural institution within its community, and any flexibility which can be generated in the existing health facility system must be directed to satisfy broad economic and social criteria. This project has tried to establish the direction for systematic research into the often ad hoc or reactive capital investment into existing health facility resources.

17. ~~Key Words and Document Analysis. 17a. Descriptors~~

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17c. COSATI Field Group

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